A Dissertation on

"A COMPARATIVE STUDY OF ADHESIVE GLUE WITH SUTURE MATERIAL (3-0 ETHYLON) FOR SKIN CLOSURE IN OPEN INGUINAL HERNIA REPAIR AT RGGGH"

A DISSERTATION SUBMITTED TO

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

CHENNAI

In partial fulfillment of the Regulations

for the award of the Degree

M.S. (GENERAL SURGERY)

INSTITUTE OF GENERAL SURGERY

MADRAS MEDICAL COLLEGE

CHENNAI

MAY – 2018

CERTIFICATE

This is to certify that the dissertation entitled **"A COMPARATIVE STUDY OF ADHESIVE GLUE WITH SUTURE MATERIAL (3-0) ETHYLON FOR SKIN CLOSURE IN OPEN INGUINAL HERNIA REPAIR AT RGGGH"** is a bonafide research work of postgraduate M.S. student, **Dr. A.ANBUSELVI,** in the Institute of General Surgery, Madras Medical College & Rajiv Gandhi Government General Hospital, Chennai, in partial fulfillment of the requirement for the degree of M.S. in GENERAL SURGERY to be held in APRIL 2018 under my guidance and supervision in 2017.

Prof. DR.R.A.PANDYARAJ, MS
FRCS(GLAS),FMAS,FICS,
FIMSA, FIAGES
FACS(USA),FALS(LAP),FMMC
Director, Institute of General Surgery
Madras Medical College &
Rajiv Gandhi Government
General Hospital,
Chennai – 600 003.

Prof. DR.R.A.PANDYARAJ, MS
FRCS(GLAS),FMAS,FICS,
FIMSA,FIAGES
FACS(USA),FALS(LAP),FMMC
Director, Institute of General Surgery
Madras Medical College &
Rajiv Gandhi Government
General Hospital,
Chennai – 600 003.

Prof.R.NARAYANA BABU M.D.,DCH,
DEAN
Madras Medical College,
RGGGH, Chennai – 600003.

DECLARATION

I, certainly declare that this dissertation titled **"A COMPARATIVE STUDY OF ADHESIVE GLUE WITH SUTURE MATERIAL (3-0) ETHYLON FOR SKIN CLOSURE IN OPEN INGUINAL HERNIA REPAIR AT RGGGH"** represents a genuine work of mine. The contributions of any supervisors to the research are consistent with normal supervisory practice, and are acknowledged.

I, also affirm that this bonafide work or part of this work was not submitted by me or any others for any award, degree or diploma to any other University board, either in India or abroad. This is submitted to The Tamil Nadu Dr. M.G.R Medical University, Chennai in partial fulfilment of the rules and regulations for the award of Master of Surgery Degree Branch I (General Surgery).

Place:

Date:

Dr.A.ANBUSELVI
Post Graduate student,
M.S.General Surgery,
Madras medical college,
Chennai.

ACKNOWLEDGEMENT

I express my deepest sense of gratitude and indebtedness to my respected teacher and guide **Dr.R.A.PANDYARAJ, M.S.**, Director and Professor, Institute of General Surgery, Madras Medical College, Chennai, whose valuable guidance and constant help have gone a long way in the preparation of this dissertation.

I express my sincere thanks to my professors **Dr.AFEE ASMA M.S., Dr.USHA DURAIRAJAN, M.S., Dr.S.BALAKRISHNAN M.S., Dr.. SURESH, M.S., DrR.LAKSHAMANA KUMAR, M.S.,** and **Dr.R.A.PANDYARAJ, M.S.,** for their extensive support and valuable advice.

I am also thankful to all my assistant professors **Dr.CAPTAIN S.NEDUNCHEZIAN,M.S Dr.T.T.SENTHILNATHAN, Dr.V.MANIVANNAN, M.S., Dr.ARUN VICTOR JEBASINGH, M.S., M.S., Dr.T.D.BALAMURUGAN, M.S. .,** and **Dr.PAULIA DEVI, M.S.**, **Dr.PARIMANA DGO, M.S.,** for their help and support.

I am extremely thankful to all the Members of the **Institutional Ethics Committee** for giving approval for my study.

I express my thanks to all the staff members of the Institute of General Surgery and all my **Postgraduates and CRRI colleagues**

and friends Dr.ARTHY, Dr.MUHAMBIGAI, Dr.SHREEJA, and my roommates Dr.ROOPA, Dr. SANGEETHA for their help during my study and preparation of this dissertation and their friendly co-operation without whom this dissertation would have shaped in this full form.

I always remember my **family members** for their everlasting blessings and encouragement.

Lastly and most importantly, I express my most sincere and heartfelt thanks to **all my patients** without whom this study would have not been possible.

Date:

Place: Chennai

Dr.A.ANBUSELVI, M.B.B.S.
Postgraduate in General Surgery
Madras Medical College
Chennai.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

INTRODUCTION

A basic need for skin closure is tissue approximation. A good tissue reunion and cosmetically acceptable scar is an ideal surgeon's practice. Wound closure techniques have evolved from early developments in suturing material to advanced resources that include skin staplers, skin glue and adhesive tapes. Based on efficacy of advanced suturing techniques patient may be benefited with better cosmesis, lesser postoperative pain and less wound infection, lesser hospital stay. Hence it is wise to study and compare adhesive glue with suture material for the better outcome.

Surgical site infection are a significant for surgeon, despite major improvements in antibiotics, better anesthesia, superior instruments, early diagnosis of problem and improved techniques of postoperative vigilance. when a surgeon sutures a clean incision, healing takes place with minimal loss of and tissue and without significant bacterial infection with minimal scarring and with glue the results are better in comparison with suture material. Tissue adhesives offer barrier to microorganism to the site of healing and therefore have a success towards reducing wound infection. time taken for skin closure is 3 minutes with adhesive glue but with suture material it takes about 7-10 minutes.best cosmesis is achieved with glue when compared with sutures. The skin suture patients needed

postoperative dressing but there was minimal cost in postoperative management of wound closure with glue. Certainly there is no risk of needle stick injury to the surgeon whilst using adhesive rather than suture. In case of sutured wound, multiple puncture sites are the source of infection which is avoided in adhesive glue thereby reducing wound infection. while applying adhesive glue for skin closure, dead space is obliterated and complete hemostasis should be achieved for better results. The cost-effectiveness of both glue and suture was found that although the cost of glue is high, total effective cost including transportation charge for follow up, loss of wages, local dressing and antibacterial medicaments was high with suture material. The overall cost effective was almost equal with adhesive glue and suture material.

Since adhesive glue plays very vital role in wound closure technique, the study is performed by comparing with suture material.

AIM & OBJECTIVES

AIM AND OBJECTIVES

To study the efficacy, cosmesis and cost effectiveness between skin adhesive and suture material.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

ANATOMY OF SKIN:

Skin is composed of three layers

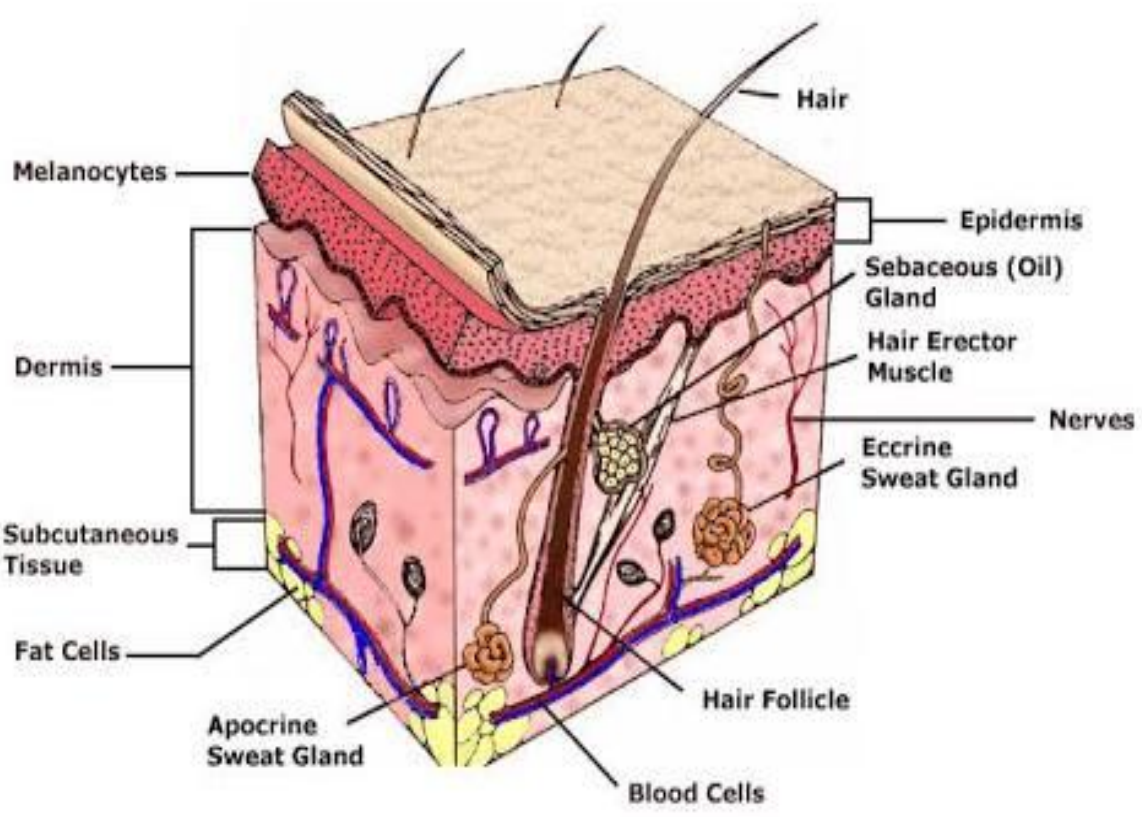
(I) Epidermis
(II) Dermis
(III) Subcutaneous tissue

EPIDERMIS:

The epidermis composed of three type of cells

(A) Keratinocytes – outer protective layer.
(B) Melanocytes – produce melanin pigment .
(C) Langerhan cells – acts as immune system.

FIGURE - 1 ANATOMY OF SKIN



DERMIS:

Dermis is the thickest of the three layers. It is further divided as papillary dermis and reticular dermis. It is composed of fibroblasts, which maintains dermis's collagen and elastin protein and these fibroblasts gives structure of skin. Elasticity and resilience is mainly due to fibroblasts. It also has sebaceous glands which secretes sebum that travels from dermis to epidermis and lubricates and protects skin surface.

SUBCUTANEOUS TISSUE;

It is composed of adipose fat cells which is responsible for insulation and padding. Cutaneous vessels arise from underlying named vessel and supply skin. angiosomes have vascular connections through caliber vessels or anastomotic vessels.

The dermis has superficial and deep plexus which are arranged horizontally and has inter connecting or communicating vessels that are oriented perpendicular to the skin surface. The subcutaneous tissue in abdomen has two portions namely superficial fatty camper's and deep membraneous scarpa's the scarpa's layer of subcutaneous tissue is more thicker in pediatric group which may be mistaken for external oblique aponeurosis.

WOUND HEALING:

Wound healing is a mechanism whereby the body attempts to restore the injured part. several factors may influence wound healing.

FACTORS INFLUENCING WOUND HEALING;

1. Site of the wound.
2. Structures involved.
3. Mechanism of wounding ; (a) Incision , (b)crush, (c) crush avulsion.
4. Contamination (foreign bodies/ bacteria)
5. Loss of tissue
6. Other local factors; (a) vascular insufficiency, (b)previous radiation, (c) pressure.
7. Systemic factors such as malnutrition , diabetes mellitus , medications such as steroids and immune deficiencies , smoking also influence wound healing.

PHASES OF WOUND HEALING;

Wound healing takes place as three or four phases;

(a) the inflammatory phase

(b) the proliferative phase

(c) remodeling phase

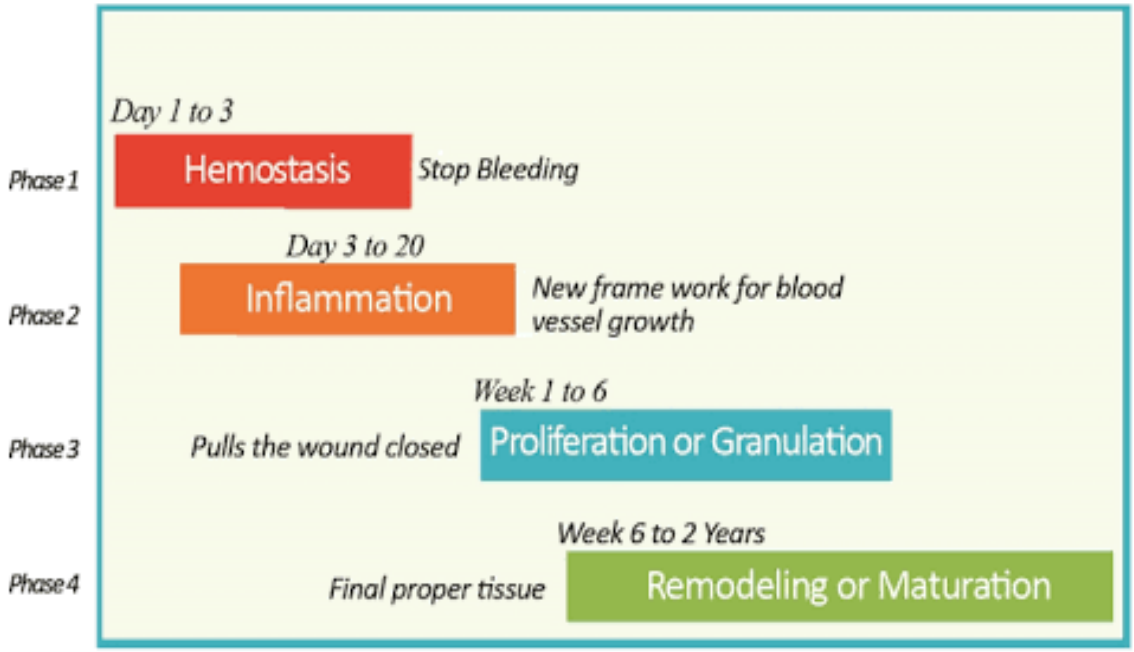
Occasionally hemostatic phase is referred to occur before inflammatory phase, or destructive phase occur following inflammation which acts as a cellular cleansing of the wound by macrophages.

INFLAMMATORY PHASE ;

It begins immediately after wounding and last for 2-3 days. When the wounding happens, there occurs bleeding which is followed by vasoconstriction and thrombus formation. Platelets gets attached to the damaged endothelial cells and release (ADP) and also several cytokines & alpha granules. There are some growth factors namely platelet derived growth factor (PDGF), Transforming growth factor (TGF BETA) and platelet factor IV which attract inflammatory cells such as polymorphonuclear lymphocytes (PMN) and macrophages .Vasoactive amines such as histamine, serotiniin and prostaglandin are also released which helps in vascular permeability and infiltration of inflammatory cells. Macrophages plays vital role in removing devitalized tissue and microorganism.

FIGURE-2

4 PHASES OF WOUND HEALING



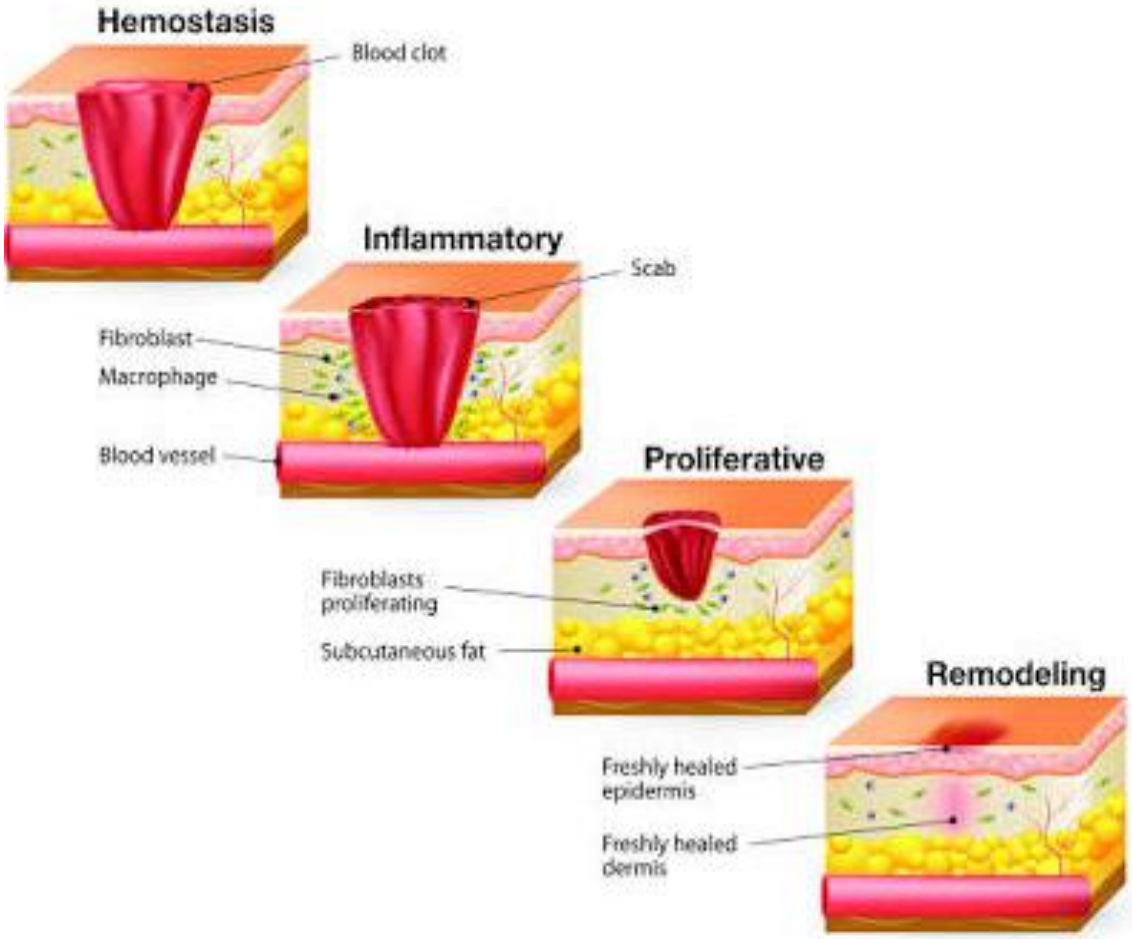
PROLIFERATIVE PHASE;

The proliferative phase starts from third day and lasts upto third week. It mainly consists of fibroblast activity with production of collagen and ground substances such as glycosaminoglycans and proteoglycans, growth of new blood vessels (angiogenesis) and re epitheliasation of the wound surface.

Vitamin c is required for fibroblast to produce collagen. In early part of this phase, granulation tissue is formed, latter there is increase in tensile strength of wound due to increased collagen. Type III collagen is deposited in proliferative phase which is arranged in random fasion.

FIGURE-3

WOUND HEALING

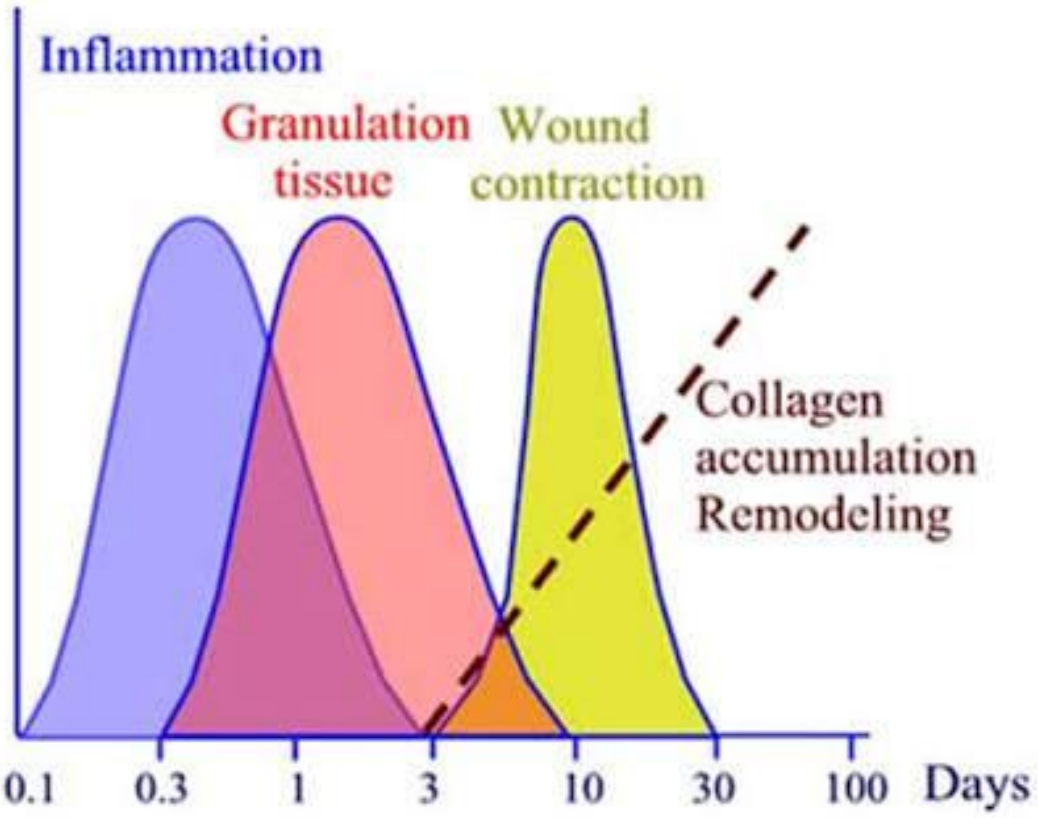


REMODELLING PHASE;

Maturation of collagen occurs in remodeling phase. Type III collagen is replaced by type I collagen with ratio of 4:1. There occurs realignment of collagen fibres and also decreased wound vascularity, wound contraction in this phase.

FIGURE-4

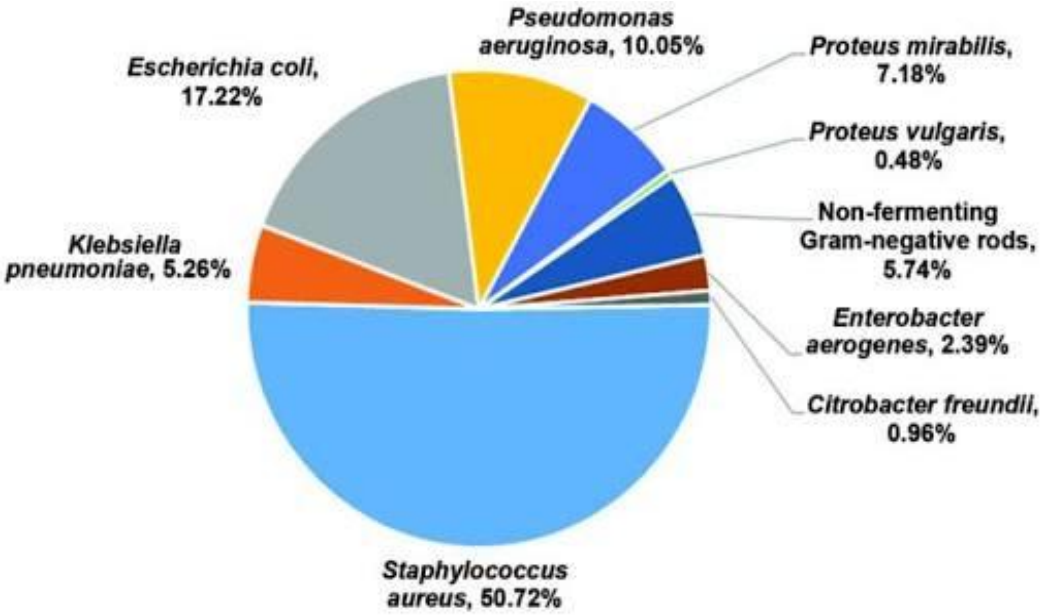
ORDERLY PHASES OF WOUND HEALING



SURGICAL SITE INFECTIONS;

SSI is the most common complication following surgical procedures. It is due to virulent bacterial entry, altered wound microenvironment and changed host defense. It can be prevented by better preoperative preparation, better surgical techniques, adherence to principles of preventive antibiotic therapy, proper infection control during surgery. The most common organism causing SSI'S is staphylococcus aureus. Other organism include clostridia, gram negative bacteria. The common source of infection that cause SSI'S include surgical wards, wounds, catheters, drains, sputum, urine, feaces and operating room without proper ventilation, nurses, surgeons. Operation techniques, sterilization of instruments also the source of infection.

FIGURE 5 – ORGANISM CAUSING SSI;



CLASSIFICATION OF SURGICAL WOUNDS;

1. 1.Clean wounds – operative procedure does not involve colonized viscus.
2. Clean-contaminated –procedure enters the colonized viscus but under controlled circumstances.
3. Contaminated wounds –surgical site is grossly contaminated in the absence of obvious infection.
4. Dirty wounds – surgical procedure is performed when active infection is present.

CLASSIFICATION OF SURGICAL SITE INFECTIONS;

A) DEPTH OF WOUND INFECTION;

I) **SUPERFICIAL SSI;** Superficial incisional SSI involves onlyn skin and subcutaneous tissue and occur within 30 days of surgery. Criteria for superficial SSI include purulent discharge, atleast one sign of inflammation,organism isolated from fluid or tissue,wound is deliberately opened by surgeon.

II) **DEEP INCISIONAL SSI;** It involves deeper tissue and occur within 30 days of surgery or 1 yr if an implant is present. Criteria of deep incisional SSI include purulent discharge from deeper incision site without organ /space involvement, facial dehiscence or deliberate separation by surgeon, deep abscess, identified by radiology/reoperation/ histopathology or attending physician declares deep infection present.

III) **ORGAN SPACE INFECTION;** It is same as deep incisional SSI with exception that pus drained from organ space site.

B) WOUND INFECTION ACCORDING TO AETIOLOGY;

I) Primary infection – wound is the primary site of infection.

II) Secondary infection – It is not directly related to the wound .

C)WOUND INFECTION ACCORDING TO TIME;

I)Early infection- within 30 days of surgical procedure.

II)Intermediate infection - between 1-3 months after wards.

III)Late infection - .> 3 months after surgery.

D)WOUND INFECTION ACCORDING TO SEVERITY;

I)Minor - discharge without cellulitis or deep tissue destruction.

II)Major - discharge of pus associated with tissue breakdown , partial or total dehiscence of the deep fascial layers of the wound , or if systemic illness is present.

FIGURE 6– SURGICAL SITE INFECTION;

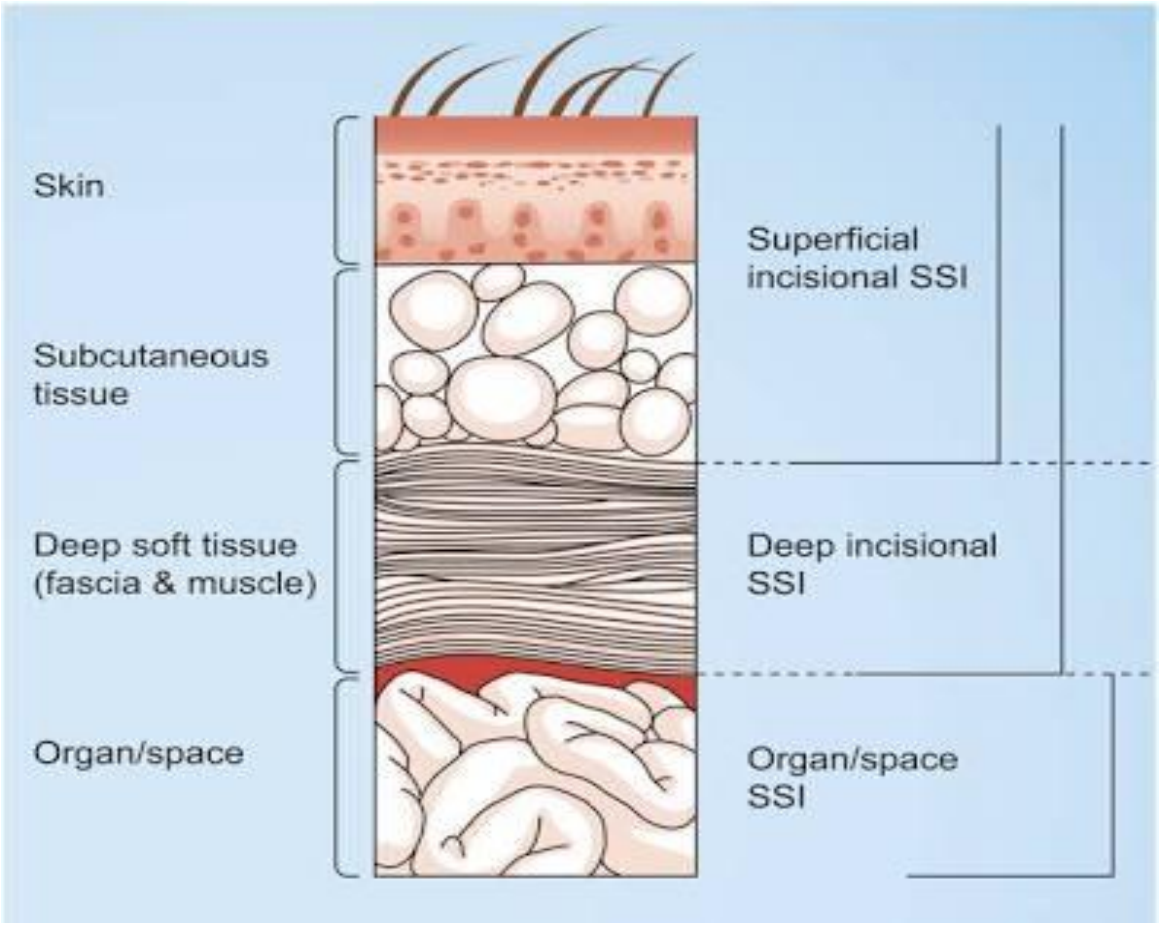


FIGURE-7:

FIGURE-8:

Table 1.

RISK FACTORS FOR DEVELOPING SSIs	
Patient Risk Factors	**Operative Risk Factors**
• Age	• Duration of surgical scrub
• Nutrition status	• Skin antisepsis
• Diabetes	• Preoperative shaving
• Smoking	• Preoperative skin preparation
• Obesity	• Duration of operation
• Other infections	• Antimicrobial prophylaxis
• Colonization	• Operation room ventilation
• Immunosuppression	• Inadequate instrument sterilization
• Length of stay	• Foreign material in surgical site
	• Surgical drains
	• Surgical technique – Poor hemostasis – Failure to obliterate dead space – Tissue trauma

TYPES OF SUTURE MATERIAL:

SILK;

In 1890s silk was used widely as suture material. It is produced from silkworm larvae as a protein fibres which gives braided material. silk is delayed absorbable and it takes 2yrs to degrade in tissue. Silk has excellent handling and knot –tying properties compared to other suture materials. Its tensile strength is low and tissue reactivity is high. Due to braided material it becomes infiltrated wih cells and hence suture removal will be very difficult and painful.

NYLON;

It was the first synthetic suture material which was introduced in 1940. It is available both as monofilament and multifilament forms. Monofilament forms retain as much as two thirds of their original strength compared to multifilament forms which has no tensile strength. Multifilament form has better handling properties and greater tissue reactivity.

POLYPROPYLENE;

Polypropylene is monofilament synthetic suture which was introduced in 1962. It has poor handling and knot security properties because of its stiff nature. It has high memory. Tissue reactivity is

extremely low for polypropylene. An additional throw is needed for adequate knot security. Polypropylene can be used for buried suture for long term dermal support.

CYANOACRYLATYE;

It was first synthesized by Airdis in 1949. Later coove et al described the adhesive properties and suggested their possible use for surgical adhesives. Cyanoacrylates are solvent free, synthetic adhesives. They are monomer liquid actually polymerizes directly on the surface where it is applied, thus creating tenacious polymer film. It provides an antimicrobial and water proof coating .It gives good cosmetic outcome and thus postoperative visit is not required. It is applied as thin layer over the entire wound and formation of bond produces heat over the skin.

FIGURE -9:

FIGURE -10 OCTYLCYANOACRYLATE:

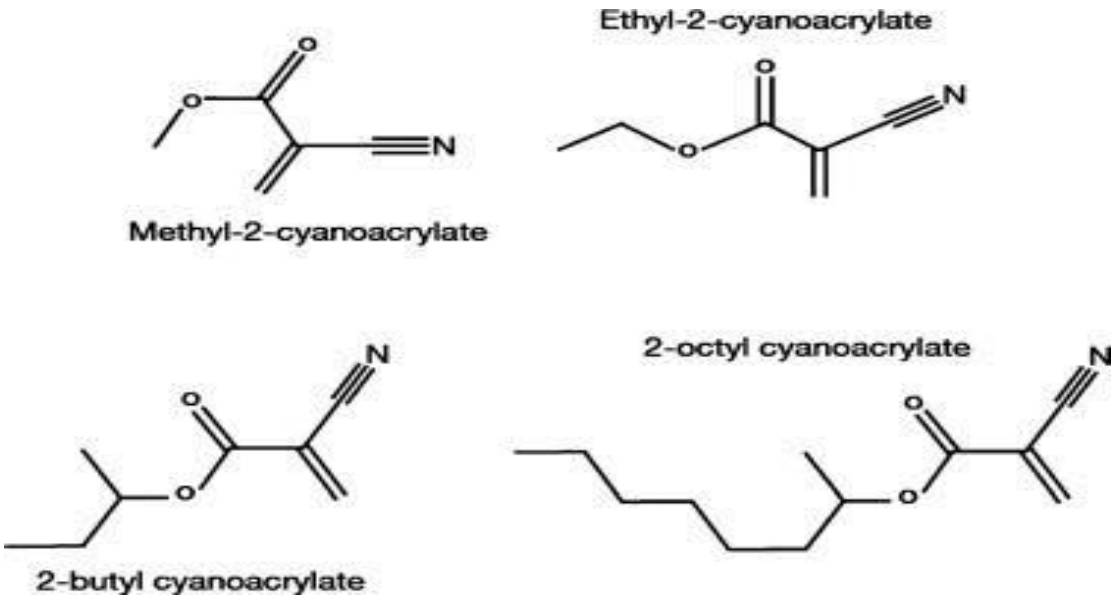


FIGURE-11

INGUINAL HERNIA :

A Hernia is defined as an abnormal protrusion of an organ or tissue through a defect in its surrounding walls. Inguinal hernia may be direct or indirect. The sac of indirect hernia passes from internal ring through external ring in contrast the sac of direct inguinal hernia protrude medial to inferiror epigastric vessels. Direct and indirect can also differentiated with cord structures. Direct sac lies anteromedial whereas indirect sac lies posterolateral to cord structures. This distinction of direct and indirect sac is of little importance because of the operative repair for these types of hernia plays significant role.

FIGURE -12 MYOPECTINEAL ORIFICE OF FRUCHADT

:

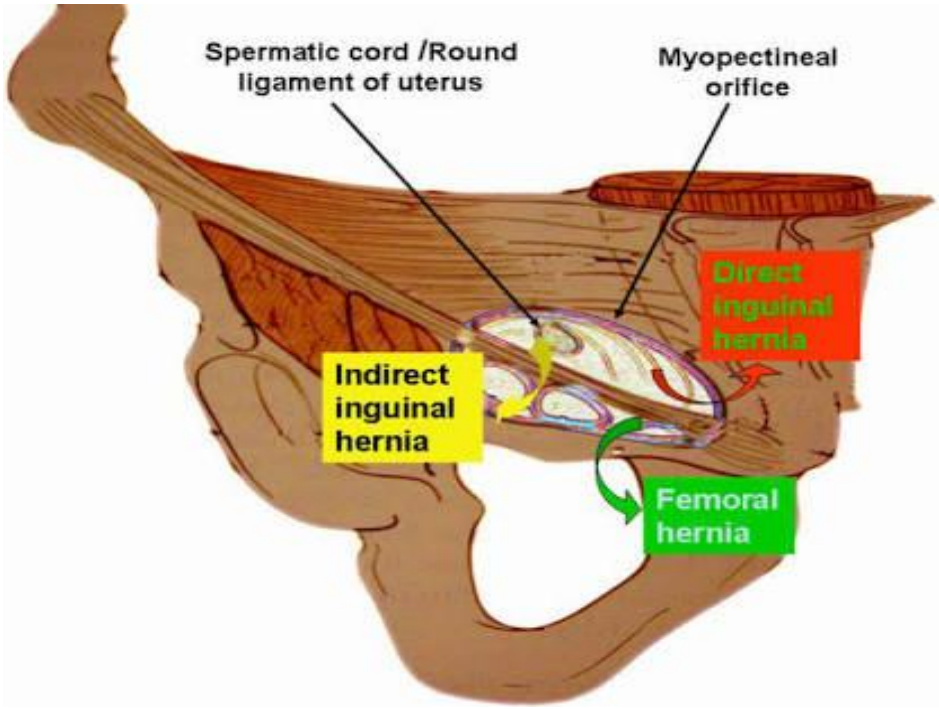


FIGURE -13

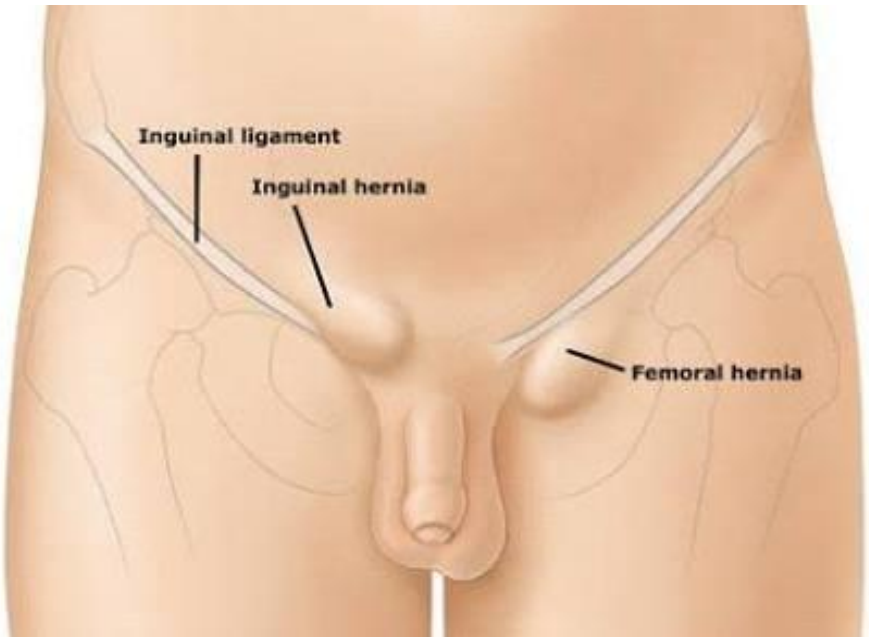
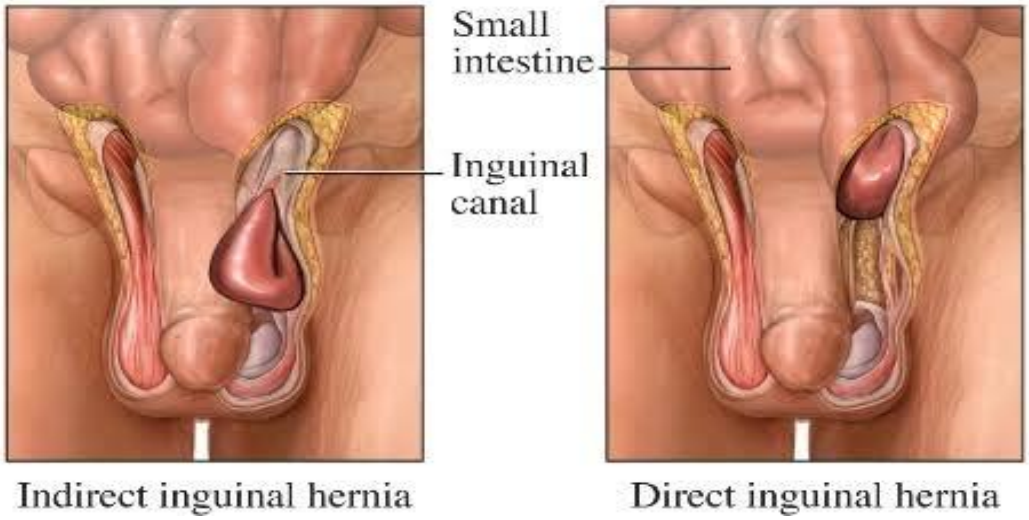


FIGURE 14 DIRECT AND INDIRECT INGUINAL HERNIA:



Hernia are a common problem, however true incidence is unknown. Incidence of abddominal hernia accounts for 5% About 75% of all hernia occurs in inguinal hernia region. Out of 75% of inguinal hernia two thirds accounts for indirect hernia and the remainder accounts for direct hernia.

Men are 25 times more likely to get groin hernias than women. In men indiect hernia predominate over direct hernia . The prevalence of hernia , particularly inguinal , umbilical and femoral hernias increases with age.

A hernia may be reducible or irreducible . In reducible hernia contents can be replaced with surrounding musculature whereas irreducible hernia can not be reduced. Strangulation is another serious complication of hernia in which there is compromised blood supply to its content resulting in gangrene of the bowel.

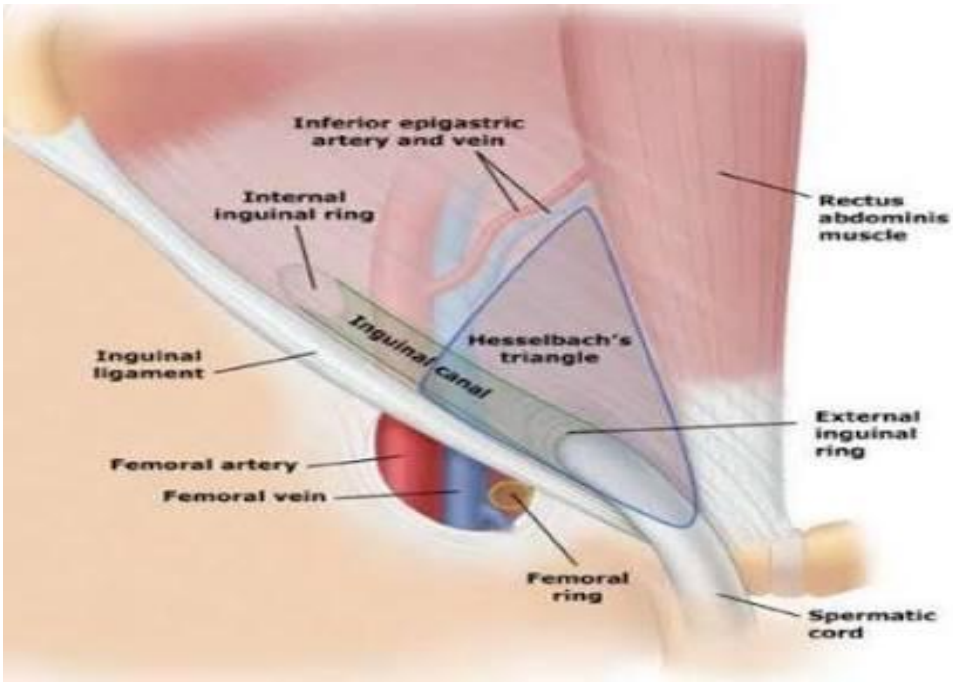
Strangulation is a fatal complication occurs more often in large hernia with small orifice. The cascade of event involves obstruction leading to edema of the bowel wall which leads on to venous obstruction followed by arterial compromise. Strangulation accounts for 1-3% and more common in indirect sac . But femoral hernias have highest rate of strangulation accounting for 15- 20%. Since femoral hernia has high chance of strangulation it is therefore advisable to repair at the time of discovery.

ANATOMY OF GROIN:

Anatomy of the groin is important for the surgeon to understand Relationships of muscles, fascia, aponeurosis, neurovascular bundle of the Inguinal hernia must be completely understood to avoid complications. There are two approaches for the henia to be dealt with. Anterior and posterior approaches will be helpful in different situations.

From anterior to posterior, the anatomy includes skin and subcutaneous tissue, below which superficial circumflex, superficial epigastric and external pudendal vessels lies. During surgery these vessels must be properly divided and ligated.

FIGURE -15 ANATOMY OF INGUINAL REGION



The order includes :

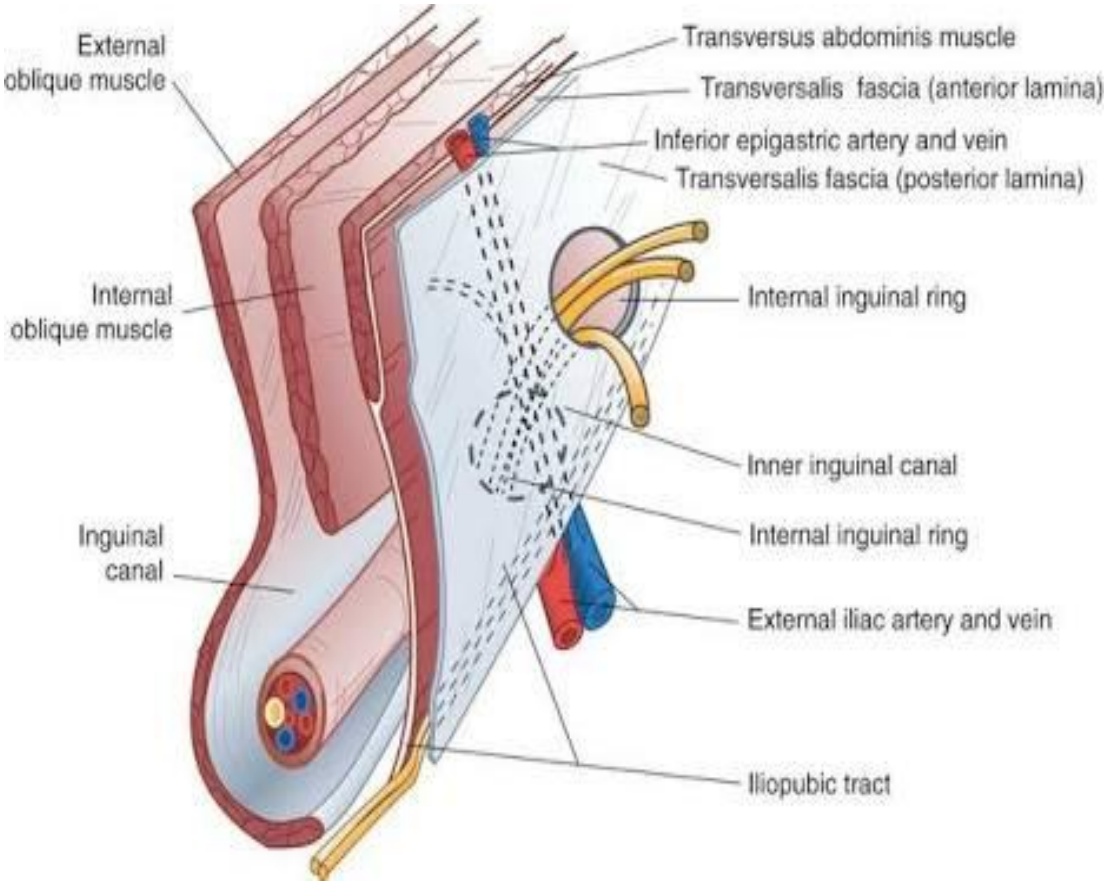
1. Skin
2. Subcutaneous tissue which includes campers and scarpa's fascia.
3. External oblique muscle and aponeurosis.
4. Internal oblique muscle and aponeurosis.
5. Transverse abdominis muscle and fascia.
6. Peritoneum.

INGUINAL CANAL:

Inguinal canal is located cepahalad to inguinal ligament and is about 4 cm length. The inguinal canal lies between internal or deep ring and external ring.

The inguinal canal is bounded anteriorly by the external oblique aponuerosis, posterioriorly by aponeurosis of transverse abdominis and transversalis fascia inferior wall of the inguinal canal is formed by the inguinal ligament and lacunar ligament, roof is formed by the internal oblique and transverse musculoaponeuroses.

FIGURE -16 INGUINAL CANAL

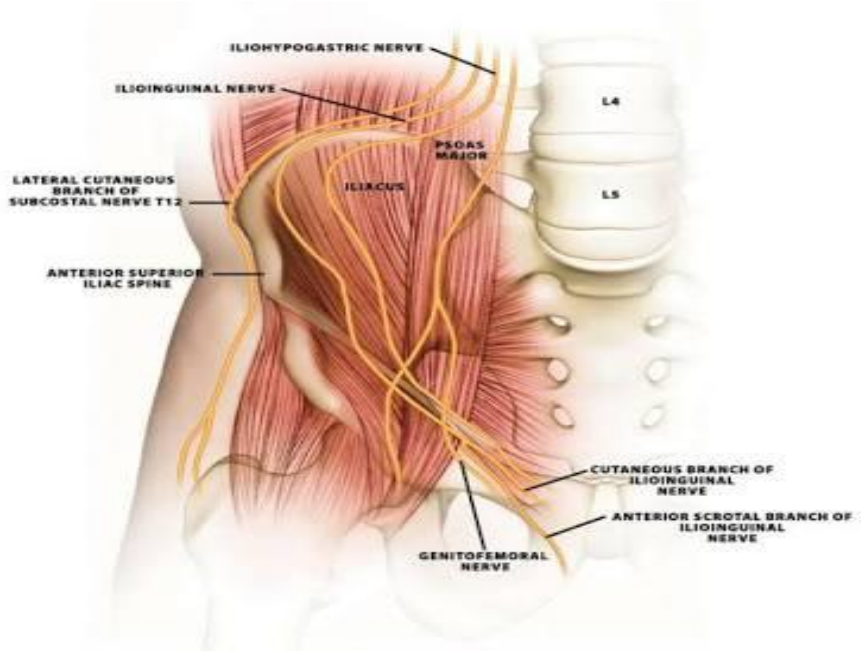


Hesselbach triangle lies in the floor of the inguinal canal. Superalateral border border formed by inferior epigastric vessel, medial formed by lateral border of rectus and inferior border formed by inguinal ligament.

Contents of the inguinal canal includes spermatic cord, illioingunal nerve and the sac. Spermatic cord contains cremasteric muscle fibres with accompanying testicular artery, pampiniform plexus, vas deferens, cremasteric vessels, lympatics, and genital branch of genitofemoral nerve.

The iliohypogastric and ilioinguinal nerve and genital branch of femoral nerve are important sensory nerves in the groin area. Genital branch of genitofemoral nerve lies on the iliopubic tract and innervates cremaster, skin of lateral scrotum and labia and joins cremaster vessel to form neurovascular bundle.

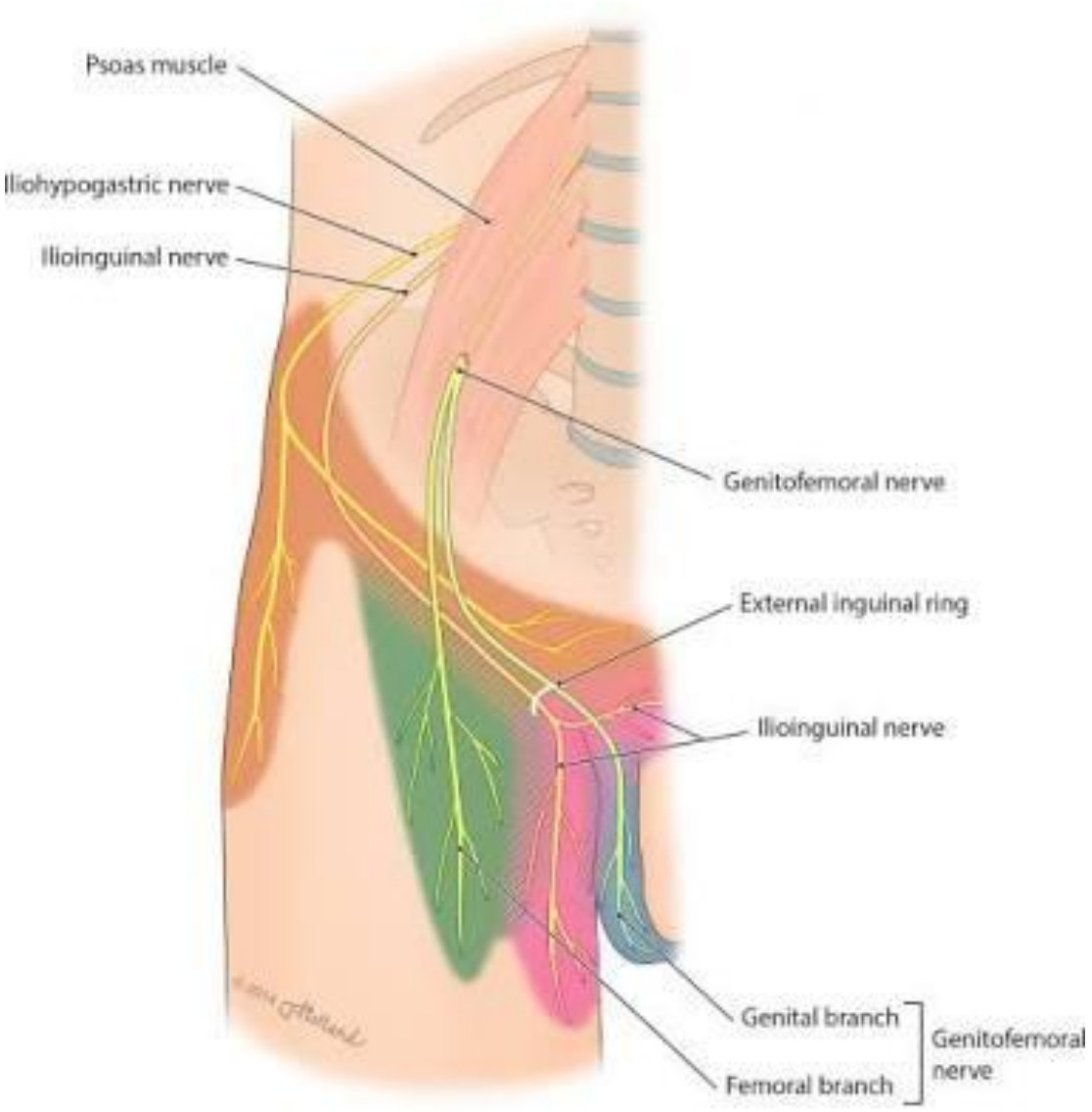
FIGURE -17 ILIOINGUINAL AND ILIOHYPOGASTRIC



ILIOINGUINAL AND ILIOHYPOGASTRIC NERVE:

The ilioinguinal and iliohypogastric lies beneath internal oblique till anterior superior iliac spine and then penetrate internal oblique to lie beneath external aponeurosis. It innervates skin of groin, base of penis and ipsilateral upper medial thigh. The main trunk of iliohypogastric nerve lies in anterior surface of internal oblique and illioinguinal nerve runs anterior to the spermatic cord in the inguinal canal.

FIGURE-18 ANATOMY OF ILLIOINGUINAL NERVE



CLINICAL PRESENTATION:

Clinically most of the patients complaints of inguinal or inguinal scrotal swelling which increases on strenuous activity and decreases on rest. Dragging type of pain is experienced by the patients due to the pull of bowel towards gravity. In case of bowel obstruction the patient may experience abdominal pain, abdominal distension, vomiting and opstipation whereas in strangulation there will features of peritonitis such as fever, abdominal guarding and rigidity and localized redness, erythema. clinical presentation includes:

a. Inguinal or inguinoscrotal swelling.
b. Pain
c. Abdominal pain
d. Abdominal distension
e. Vomiting
f. Obstipation.
g. Fever

} Bowel obstruction and gangrene.

PREDISPOSING FACTORS: It includes:

1. Persistent coughing of chronic bronchitis
2. Constipation
3. Straining at urination with frequency and urgency – BPH.
4. Previous abdominal surgery – appendectomy.

CLINICAL EXAMINATION:

Usually clinical examination of inguinal region is performed in standing position exposing from umbilicus till thigh after getting informed consent. Cough impulse is the most significant feature in hernia. If a swelling moves from lateral to medial and pyramidal shape it is suggested as indirect hernia, if a bulge moves from deep to superficial in the inguinal canal region it is direct hernia. There are some clinical test to differentiate direct and indirect which includes:

a. Deep ring occlusion test.
b. Ziemann's three finger test
c. Ring invagination test.

DEEP RING OCCLUSION TEST:

On standing position exposing from umbilicus till thigh deep ring is occluded and the patient is asked to cough, if a impulse felt at the finger then it is indirect hernia. If a impulse seen medial to deep ring then it is direct sac.

THREE FINGER TEST:

It is applied when there is no obvious swelling or after swelling has been reduced. Index finger is placed over deep ring, middle finger over external ring or superficial ring and ring placed over saphenous opening

and the patient is asked to cough or blow nose. If an impulse felt at index finger it is indirect hernia, middle finger it is direct hernia and ring finger then it is femoral hernia.

RING INVAGINATION TEST:

After reducing of the hernia, patient in recumbent position little finger is used to invaginate the skin from the bottom of the scrotum and the little finger is pushed up to palpate pubic tubercle. The finger is then rotated and pushed further up to into the superficial ring .If the impulse felt on the pulp of the finger the hernia is direct one and if the impulse on the tip then it is indirect hernia. It is not done nowadays since it is a painful procedure and also the approach to both direct and indirect hernia is same .

DIAGNOSIS:

Clinical examination is the most diagnostic criteria in case of hernia. However preop evaluation is most important to prevent recurrent hernia. It includes chest xray to rule bronchitis, copd. Per rectal examination is most important factor to rule out benign prosatatic hyperplasia. In case of prostatomegaly it is essential to look for post voidal residual urine collection.

NYHUS CLASSIFICATION OF GROIN HERNIA:

TYPE I :

Indirect inguinal hernia : internal inguinal ring normal .

Type II :

Indirect inguinal hernia : Internal ring dilated but posterior inguinal wall intact

Inferior epigastric vessels not displaced.

TYPE III:

Posterior wall defect

A. Direct Inguinal hernia.
B. Indirect inguinal hernia : internal inguinal ring dilated ,medially encroaching on or destroying the transversalis fascia .
C. Femoral hernia.

TYPE IV:

Recurrent hernia

A. Direct
B. Indirect
C. Femoral and
D. D. Combined.

TREATMENT :

The most popularly used technique is Lichenstein tension free repair. Since the tension in the hernia is the principal cause of recurrence, current trend in hernia management is the use of synthetic mesh to bridge the defect.

MATERIALS AD METHODS

MATERIALS AND METHODS

STUDY DESIGN:

Comparative study done in 100 patient in two groups.

STUDY CENTRE:

Madras medical college & Rajiv Gandhi government general hospital, Chennai.

INCLUSION CRITERIA:

1. All patients of more than 13 yrs of age upto 60 yrs undergoing open inguinal hernia repair.
2. Patients with unilateral or bilateral inguinal hernia.

EXCLUSION CRITERIA:

1. Patients of less than 12 yr and 60 yrs.
2. Patients who underwent previous hernia repair.
3. Diabetic and immune-compromised individual.
4. Patients with skin disease over operating area.

SOURCE OF COLLECTION:

All patients with unilateral or bilateral inguinal hernia who get admitted in Rajiv Gandhi hospital and who fit the inclusion criteria will be observed and following data collected ;

1. Details of participants including disease characteristics.
2. Details of type of intervention.
3. Details of outcomes reported.

Patients who get operated for inguinal hernia will be divided into two groups as group1 and group 2. Patients in group 1 will skin closure with suture material and group 2 with intermittent 3-0 ethylon. Five parameters will be studied.

1. Time taken for skin closure with suture material and skin glue.
2. Postoperative wound infection using ASEPSIS SCORE for suture material and skin glue .
3. Postoperative scar assessed using Vancouver scar scale.
4. Postoperative pain studied with visual analogue scale for both suture material and skin group.
5. Wound cosmesis assessed with modified Hollander scale for both groups.

1.TIME:

In this time taken for closure of skin following open inguinal hernia is compared in both skin glue and suture group in minutes. Time taken for skin closure was less than 3min with adhesive glue but with suture material it takes about 7-10 min.

2. POSTOPERATIVE WOUND INFECTION;

Postoperative wound infection is studied using ASEPSIS SCORE. Both skin glue and suture group will be compared.

1. Patient will be inspected for first 5 day of postoperative period for
    a) Serous exudates
    b) Erethyma
    c) Purulent discharge
    d) Separation of deeper tissue.
2. Additional treatment for wound, culture finding and duration of stay in hospital will be analysed.
3. Sum of points from first 4 day daily wound inspection, points for antibiotics, points for pus drainage, wound debridement and bacterial isolation and points for prolonged hospitalization include ASEPSIS SCORE.
4. Minimum score – 0 and maximum score – 70.
5. 0-10 - satisfactory healing

    11-20 –disturbance in healing

    21-30 –minor wound infection

    31-40 – moderate wound infection.

    >40 - severe wound infection.

FIGURE -19

Wound characteristic	Proportion of wound affected					
	0	<20	20-39	40-59	60-79	>80
Serous exudates	0	1	2	3	4	5
Erythema	0	1	2	3	4	5
Purulent exudates	0	2	4	6	8	10
Separation of deep tissues	0	2	4	6	8	10

Points are scored for daily wound inspection

Criterion	Points
Additional treatment	
Antibiotics	10
Drainage of pus under local anesthesia	5
Debridement of wound (general anesthesia)	10
Serous discharge*	Daily 0-5
Erythema*	Daily 0-5
Purulent exudate*	Daily 0-5
Separation of deep tissues*	Daily 0-5
Isolation of bacteria	10
Stay as inpatient prolonged over 14 days	5

*Given score only on 5 of 7 days. Highest weekly score used. Category of infection - Total score 0-10: Satisfactory healing, 11-20: Disturbance of healing, 20-30: Minor wound infection, 31-40: Moderate wound infection, >40: Severe wound infection (adapted from Wilson AP *et al*., Lancet 1986[16])

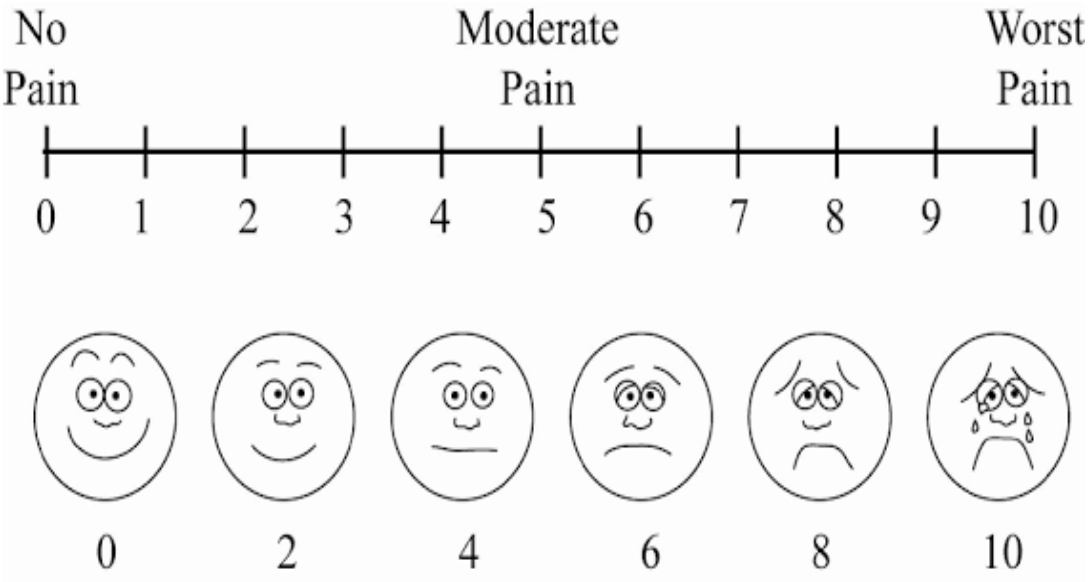
ASEPSIS SCORE

3. POSTOPERATIVE PAIN:

Postoperative pain following skin closure with skin glue and suture material is studied using VISUAL ANALOGUE SCALE. VAS is numerical distress scale which has 0-10 numerical value. scale 0 indicates no pain and scale 10 indicates severe pain.

Patient's postoperative pain will be assessed on 0hrs, 24hrs, 48hrs, 72hrs and 7th postoperative day for both skin glue and suture material group. In traditional skin closure with suture material, patient experiences pain during postoperative period of about 5-7 days and have to come for suture removal which indeed will cause pain.

FIGURE-20 VISUAL ANALOGUE SCALE



4.POSTOPERATIVE SCAR:

Postoperative scar following skin closure with skin glue and suture group is studied using Vancouver scar scale. Vancouver scar scale was initially used to assess the burns scar. It allows assessment of four parameter;

a) Pigmentation
b) Vascularity
c) Pliability
d) Scar height

Patients will be followed on 7^{th} pod,1^{st} month, 3^{rd} month and 6^{th} month for scar integrity. vancouver score ranges from 0-13 .

FIGURE - 21 VANCOUVER SCAR SCALE

Pigmentation

0 = Normal color
1 = Hypopigmentation
2 = Hyperpigmentation

Vascularity

0 = Normal
1 = Pink (slight increase in blood supply)
2 = Red (significant increase in blood supply)
3 = Purple (excessive local blood supply)

Pliability

0 = Normal
1 = Supple (flexible with minimal resistance)
2 = Yielding (giving way to pressure, offering moderate resistance, but does not behave as a solid scar mass)
3 = Firm (solid/inflexible unit, not easily moved, resistant to manual pressure)
4 = Banding (rope-like tissue that blanches with extension of scar, does not limit range of motion)
5 = Contracture (permanent shortening of scar producing deformity or distortion; limits range of motion)

Height

0 = Normal
1 = <2 mm
2 = ≥2 mm and <5 mm
3 = ≥5 mm

5.WOUND COSMESIS:

Cosmetic effect following skin closure for both groups is studied using MODIFIED HOLLANDER SCALE. Wound cosmesis is assessed on 7th pod,1st month, 3rd month and 6th month. It uses five parameter ;

a) Step off borders
b) Edge inversion
c) Contour irregularities
d) Margin separation
e) Excessive distortion.

Patient satisfaction score (1-10) and operator satisfaction score is compared.

FIGURE - 22 MODIFIED HOLLANDER SCALE

ID	**Step-off of borders** (Edges not on the same plane)	**Contour irregularities** (Wrinkled skin near the wound)	**Margin separation** (Gap between the sides)	**Edge inversion** (Wound not properly everted)	**Excessive distortion** (Swelling or infection)	**Patient satisfaction score** (1–10)	**Operator satisfaction score** (1–10)
A							
B							
C							
D							
E							

Is the overall appearance? ☐ Acceptable ☐ Not acceptable

For each wound, please answer Yes or No to each characteristic.
After Hollander JE, Singer AJ, valentine SM, et al. Wound registry: development and validation. Ann Emerg Med 1995;25;675-85.[8]

RESULTS

RESULTS

METHOD OF STATISTICAL ANALYSIS:

The following method of statistical analysis have been used in this study.

The results were averaged (mean ±standard deviation)for continuous data and number and percentage for dichotomous data are presented in Table and Figure.

1. Univariate analysis of the dichotomous variables encoded was performed by means of the chi-Square test with Yates correction if required.

Chi-Square χ^2 for (2*2 tables)

GROUP	Absent	Present	Total
Adhesive glue	a	b	a +b
Skin suturing	c	d	c +d
total	a +c	b +d	N

a, b, c, d are the observed numbers.

N is the Grand total χ^2 with 1 DF = $N(ad-bc)^2 | (a+b)(c+d)(a+c)(b+d)$

DF =(r-1)*(c-1), where r =rows and c=columns

DF = Degree of freedom (Number of observation that are free to vary after certain restriction have been placed on the data)

2. Student "t' test.

The student 't' test was used to determine whether there was a statistical difference between male and female subjects in the parameters measured.

Student's t test is as follows:

$$t=\frac{\bar{x}_1-\bar{x}_2}{s\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} \sim\sim\sim t_{n1+n2-2} \quad \text{Where } s^2=\frac{(n_1-1)s_1^{\,2}+(n_2-1)s_2^{\,2}}{(n_1+n_2-2)}$$

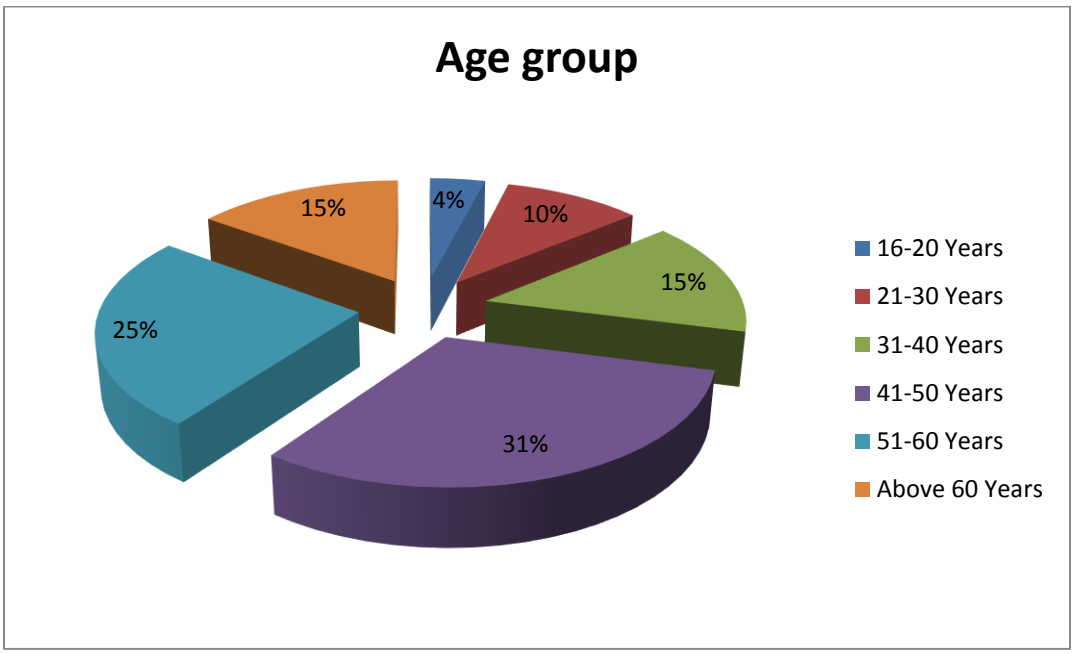
In all the above test P value less than 0.05 were taken to be statiscally signficant. The data was analyzed using SPSS package.

TABLE-1

COMPARISION OF AGE GROUP AMOUNG STUGY GROUP

AGE GROUP	Frequency	Percent
16-20 Years	4	4.0
21-30 Years	10	10.0
31-40 Years	15	15.0
41-50 Years	31	31.0
51-60 Years	25	25.0
Above 60 Years	15	15.0
Total	100	100.0

FIGURE-23



From the above figure it is concluded that the most common age group affecting inguinal hernia is age group between 31-40 years.

TABLE -2

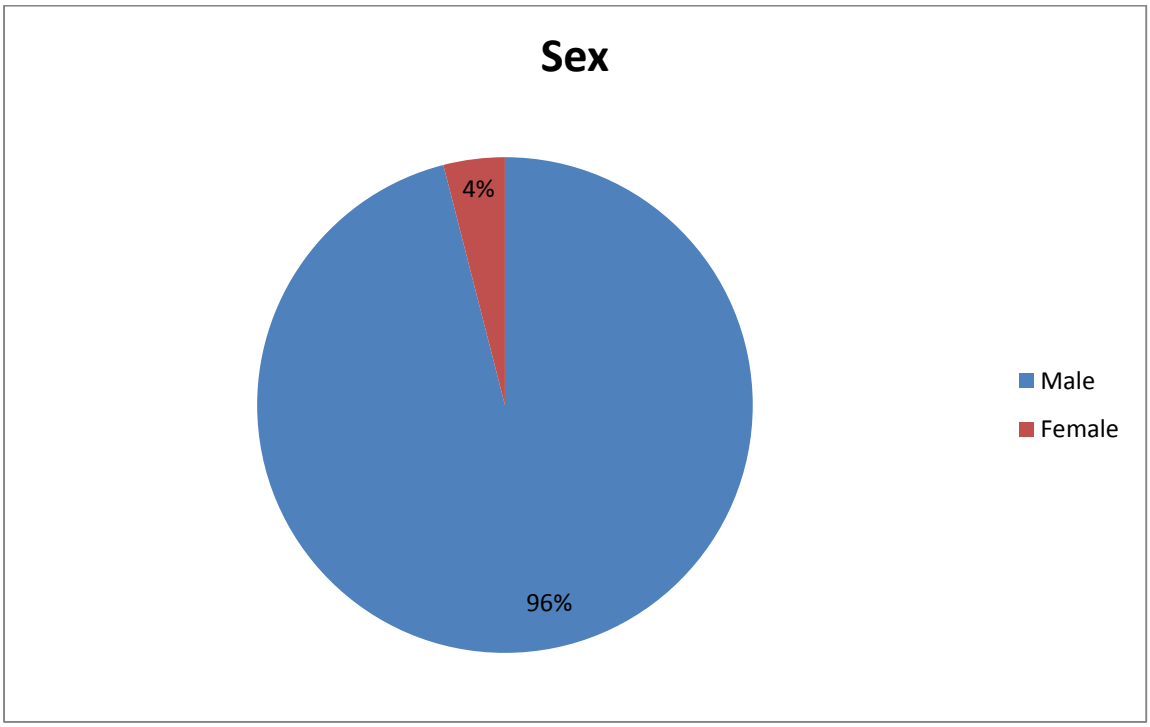
COMPARISION OF SEX GROUP AFFECTING STUDY GROUP:

SEX	FREQUENCY	PERCENT
Male	96	96
Female	4	4.0
TOTAL	100	100.0

The patient in both groups were selected alternatively with group 1 being skin glue and group 2 being suture group. Above tables shows there were 96 males and 4 females in the present study.

FIGURE- 24

GENDER DISTRIBUTION OF STUDY GROUP



The above pictorial diagram depicts percentage of gender distribution of 96% males and 4% of females in our study.

TABLE -3

COMPARING THE DIAGNOSIS IN STUDY POPULATION:

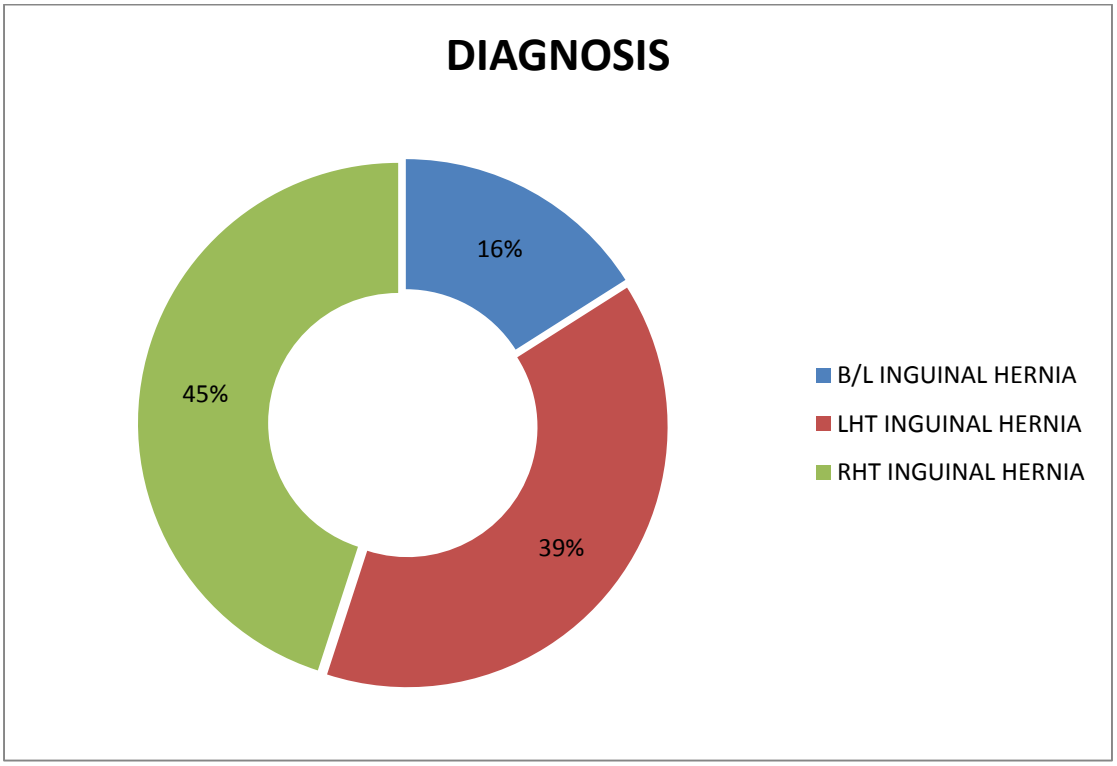
DIAGNOSIS	FREQUENCY	PERCENT
B/L Inguinal hernia	16	16.0
LHT Inguinal hernia	39	39.0
RHT Inguinal hernia	45	45.0
Total	100	100.0

In our study, patient were selected randomly and skin glue and suture material were applied. Above table shows left inguinal hernia (39%), right inguinal hernia (45%) and bilateral hernia (16%).

FIGURE -25

COMPARING THE DIAGNOSIS IN STUDY POPULATION

-



Above picture demonstrates that percentage of diagnosis in study group such as bilateral hernia (16%) , left inguinal hernia (39%) and right inguinal hernia (45%).

TABLE-4

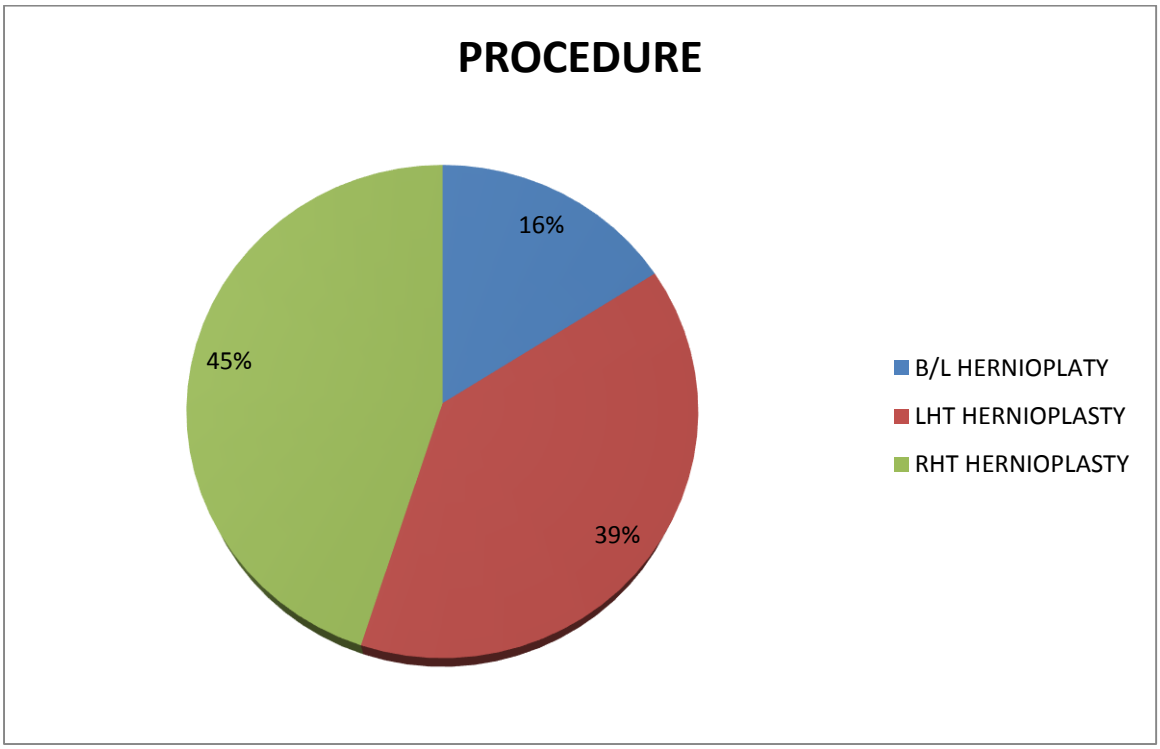
COMPARISION OF PROCEDURE DONE IN STUDY GROUP;

PROCEDURE	FREQUENCY	PERCENT
B/L hernioplasty	16	16.0
LHT hernioplasty	39	39.0
Rht hernioplasty	45	45.0
Total	100	100.0

The patient in both group were selected randomly and surgery performed in both groups were the same procedure that is hernioplasty. Above table shows frequency of procedure done for bilateral hernia – 16, left hernia -39 and right hernia - 45.

FIGURE - 26

COMPARISION OF PROCEDURE AMOUNG STUDY GROUP :



The above pictorial demonstration states the percentage of procedure done in study group for Bilateral hernia -16%, right hernia -45% and left hernia -39%

TABLE-5

COMPARISION OF SKIN AND SUTURE MATERIAL USED IN STUDY GROUP

MATERIAL	FREQUENCY	PERCENT
SUTURE	50	50.0
GLUE	50	50.0
Total	100	100.0

FIGURE - 27

SKIN AND SUTURE MATERIAL:

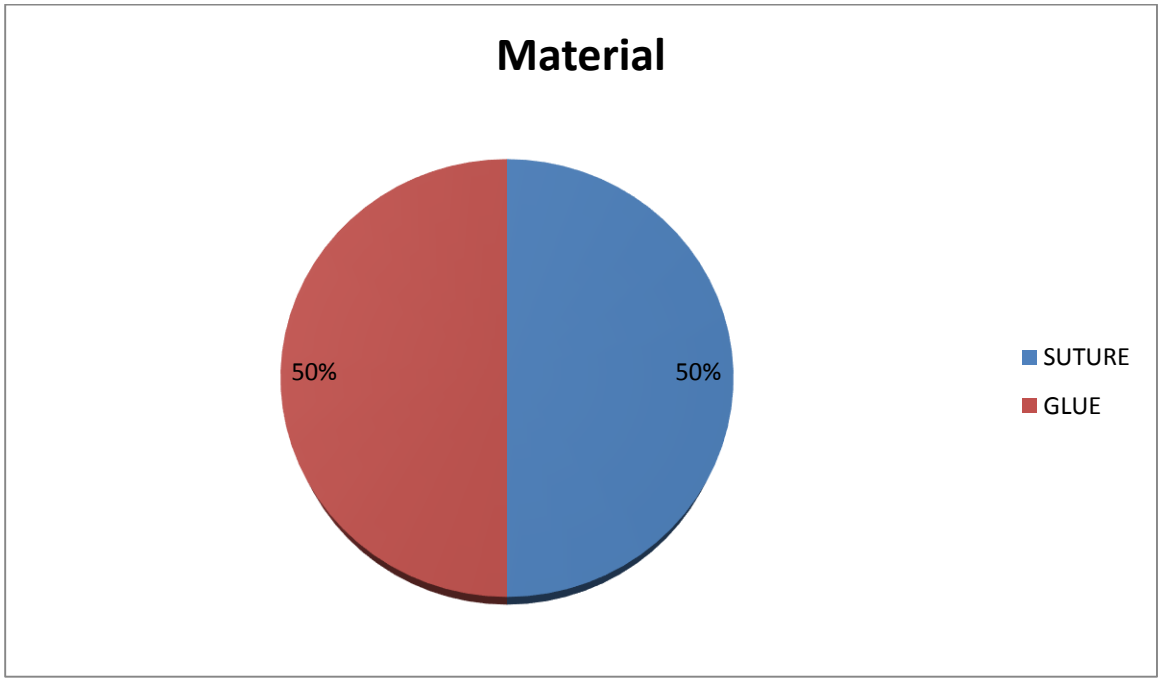


TABLE -6

COMPARISION OF TIME TAKEN FOR CLOSURE IN SKIN GLUE AND SUTURE GROUP;

INDEPENDENT T TEST						
	SUTURE	N	Mean	Std. Deviation	Std. Error Mean	t value
TIME FOR CLOSURE MIN	SUTURE	50	4.8800	1.53384	.21692	7.534**
	GLUE	50	2.7200	1.32542	.18744	

P* - <0.01

The time taken for skin closure is measured using stop watcher in both skin glue and suture group and entered in minutes. Above table shows the Mean time taken for skin closure and it can be observed that the mean time taken for skin closure in adhesive group is 2.72 minutes±1.32 and that of suture group is 4.88 minutes±1.533. This difference if of great significance with p value of <0.001

FIGURE -28 APPLICATION OF SKIN GLUE:

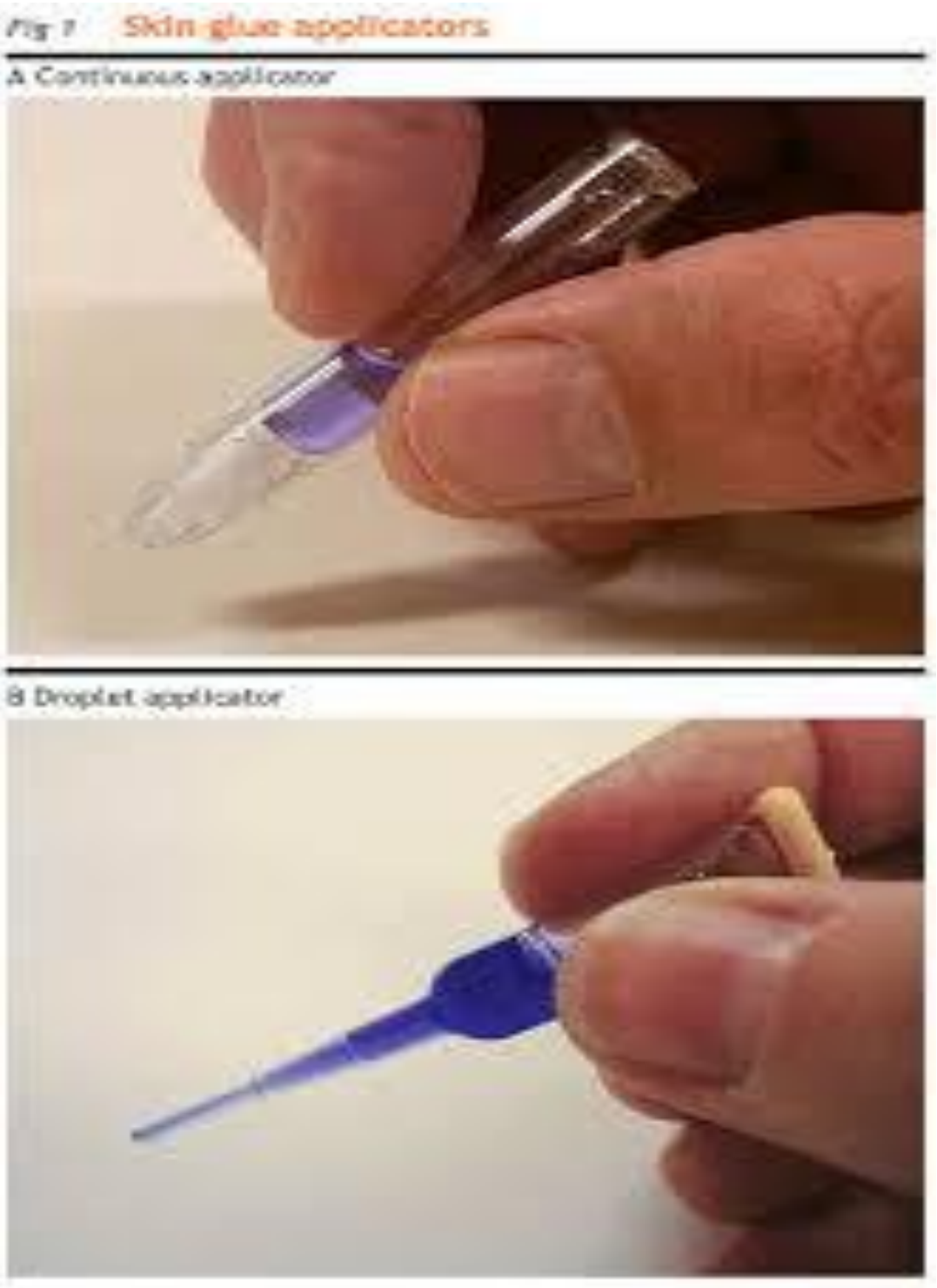


FIGURE -29

MEAN TIME TAKEN FOR SKIN CLOSURE AMOUNG THE STUDY GROUP

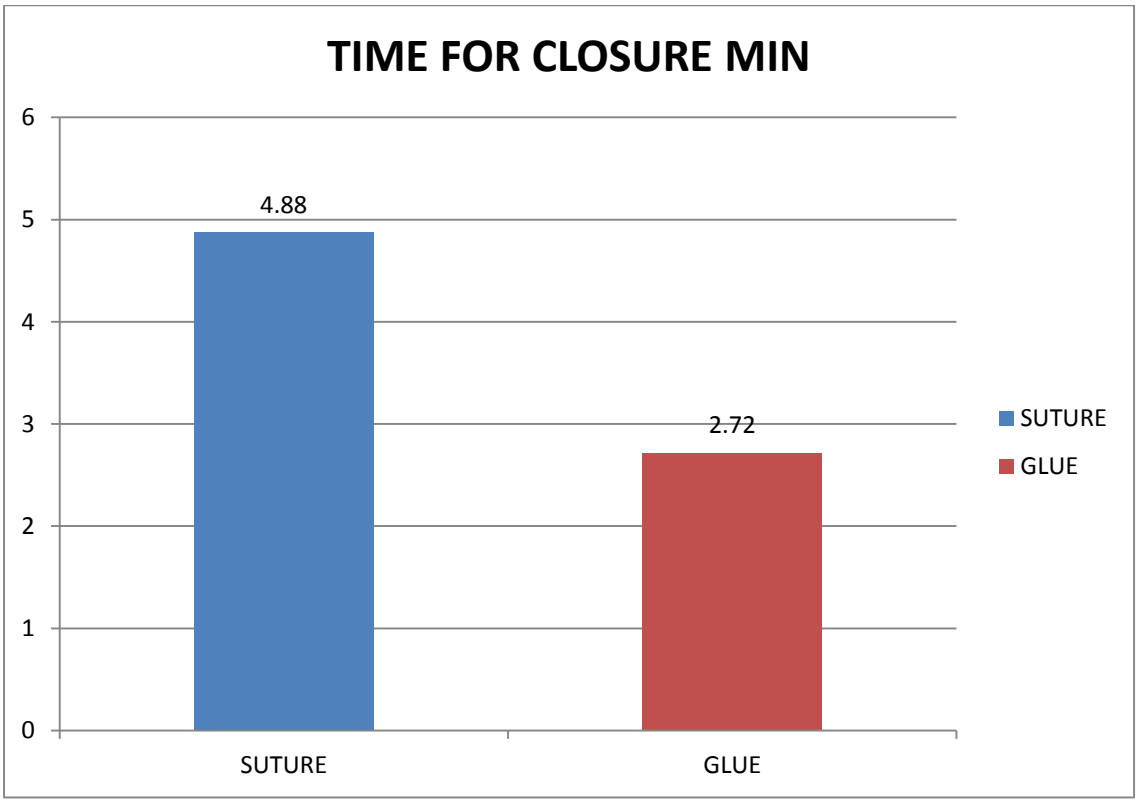
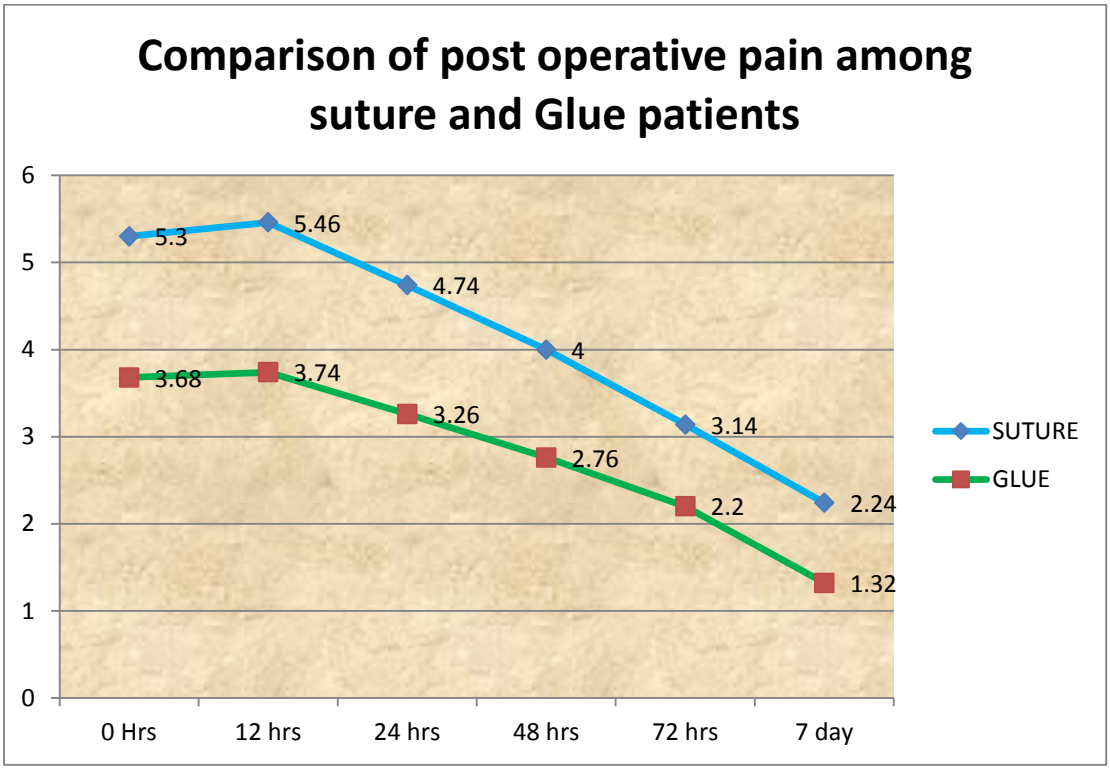


FIGURE-30 SUTURE APPLICATION IN HERNIA REPAIR

COMPARISON OF POSTOPERATIVE PAIN AMOUNG SKIN AND SUTURE GROUP;

The postoperative pain in both groups were studied using Visual analogue scale. visual analogue scale is a numerical scale which ranges from 0-10 with scale 0- no pain and scale 10- worst pain. The postoperative pain being monitored at 0 hrs, 12hrs, 24hrs, 48hrs, 72hrs and 7^{th} postoperative day.

FIGURE -31



In the present study it is observed that postoperative pain is monitored at ohrs, 12hrs, 48hrs, 72hrs and 7th postoperative day. It is observed patient with skin glue have lesser postoperative pain in early hrs than suture material. The visual analogue scale shows mean vaue of 5.3±0.68 for suture group and for skin group it is 3.68±0.62. this value is of great significance with p value <0.001.

TABLE-7

COMPARISION OF POSTOPERATIVE PAIN IN STUDY GROUP:

	SUTURE	Mean	Std. Deviation	N		F value for time	F value for group
POSTOPERATIVE_PAIN___0_hrs	SUTURE	5.30	0.678	50	0.096	594.306**	14.281**
	GLUE	3.68	0.621	50	0.088		
POSTOPERATIVE_PAIN__12_hrs	SUTURE	5.46	0.885	50	0.125		
	GLUE	3.74	0.527	50	0.075		
POSTOPERATIVE_PAIN__24_hrs	SUTURE	4.74	0.751	50	0.106		
	GLUE	3.26	0.527	50	0.075		
POSTOPERATIVE_PAIN__48_hrs	SUTURE	4.00	0.606	50	0.086		
	GLUE	2.76	0.476	50	0.067		
POSTOPERATIVE_PAIN_72_hrs	SUTURE	3.14	0.535	50	0.076		
	GLUE	2.20	0.404	50	0.057		
POSTOPERATIVE_PAIN__7_day	SUTURE	2.24	0.476	50	0.067		
	GLUE	1.32	0.513	50	0.073		

TABLE-8

COMPARISION OF ASEPSIS SCORE AMONG

STUDY GROUP:

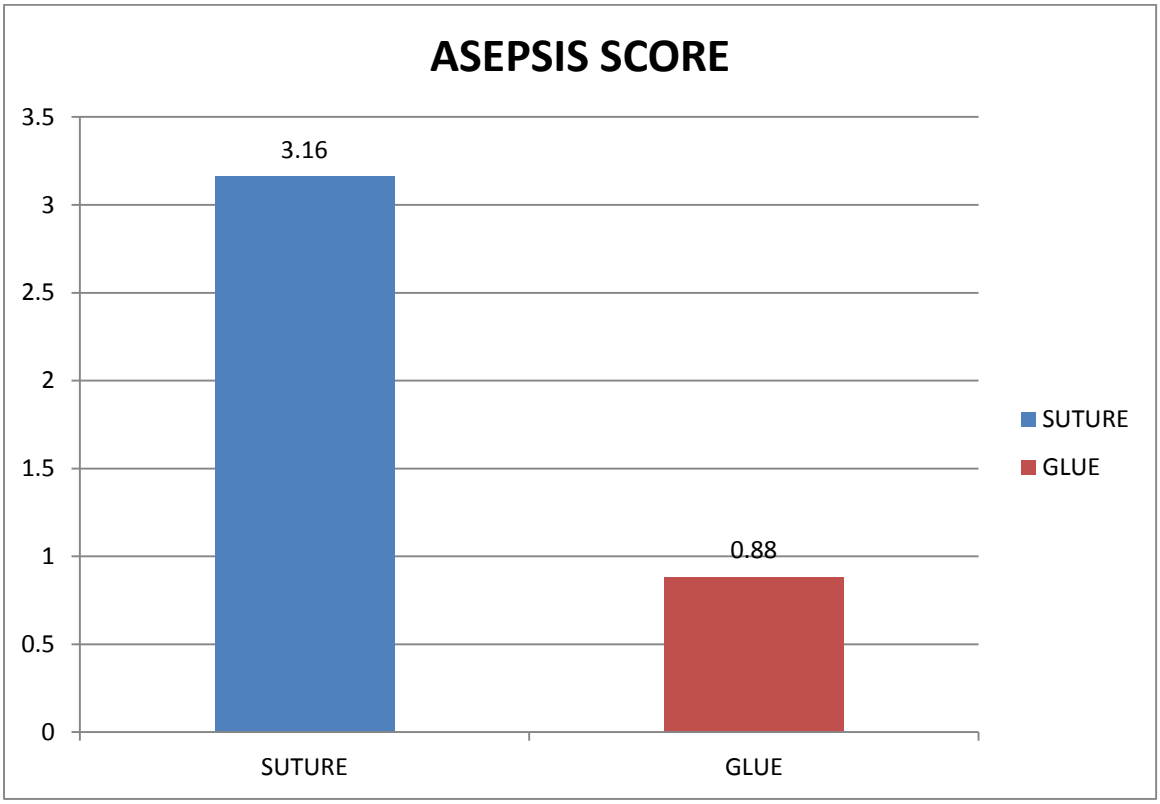
INDEPENDENT T TEST						
	SUTURE	N	Mean	Std. Deviation	Std. Error Mean	t value
ASEPSIS SCORE	SUTURE	50	3.1600	.76559	.10827	15.650**
	GLUE	50	.8800	.68928	.09748	

**p<0.001

The above table shows that the mean ASEPSIS score for skin glue group is 0.88±.689 and for suture group is 3.16±0.765.This difference is of significant with p value of <0.001.

FIGURE - 32

COMPARISION OF ASEPSIS SCORE AMONG STUDY GROUP



Above picture demonstrates the outcome of wound using ASEPSIS SCORE for skin glue group is 3.16 and for suture group is 0.88. This difference is of great significance and the outcome is good with adhesive group.

TABLE - 9

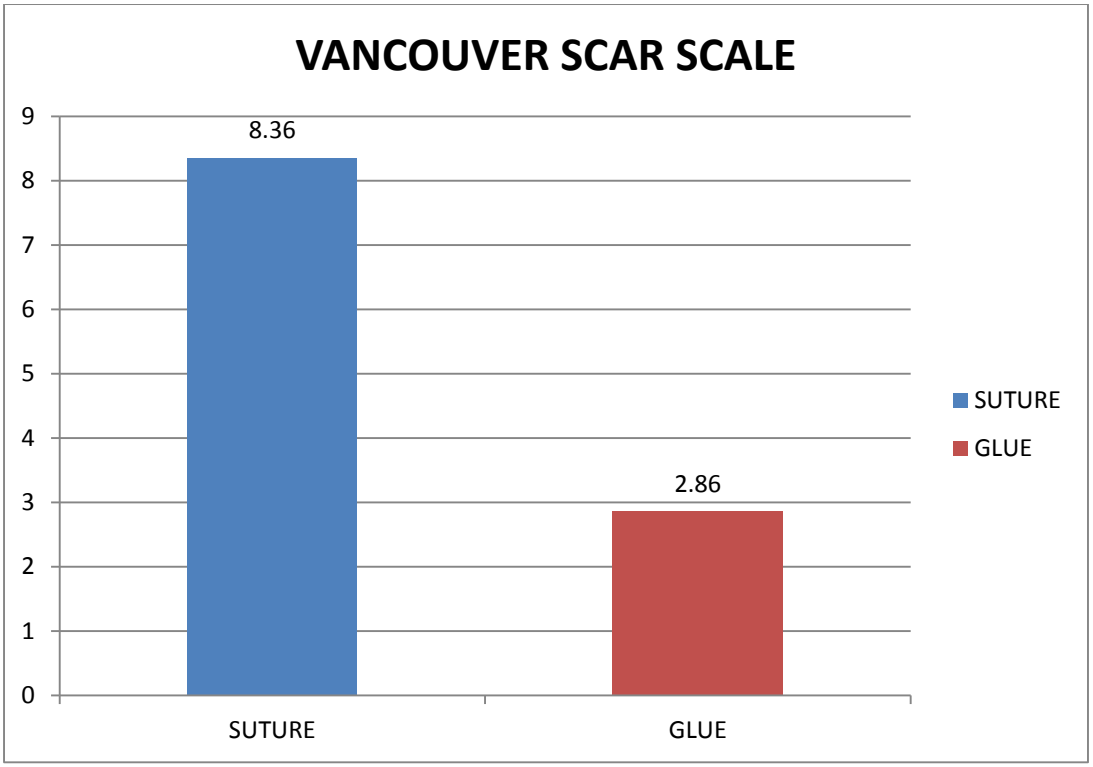
COMPARISION OF POSTOPERATVE SCAR AMONG STUDY GROUP:

INDEPENDENT T TEST						
	SUTURE	N	Mean	Std. Deviation	Std. Error Mean	t value
VANCOUVER SCAR SCALE	SUTURE	50	8.3600	.85141	.12041	34.152**
	GLUE	50	2.8600	.75620	.10694	

**p<0.001

Postoperative scar is analyzed with Vancouver scar scale at regular intervals. In the present study it is observed that score is high for suture group than skin glue group. The mean score for suture group is 8.3±0.8 and for skin glue group it is 2.8±0.75.This difference of score is of great significance with p value <0.001.

FIGURE - 33



Above pictorial diagram represents mean score for postoperative scar for suture group -8.3 and for skin glue group it is 2.86

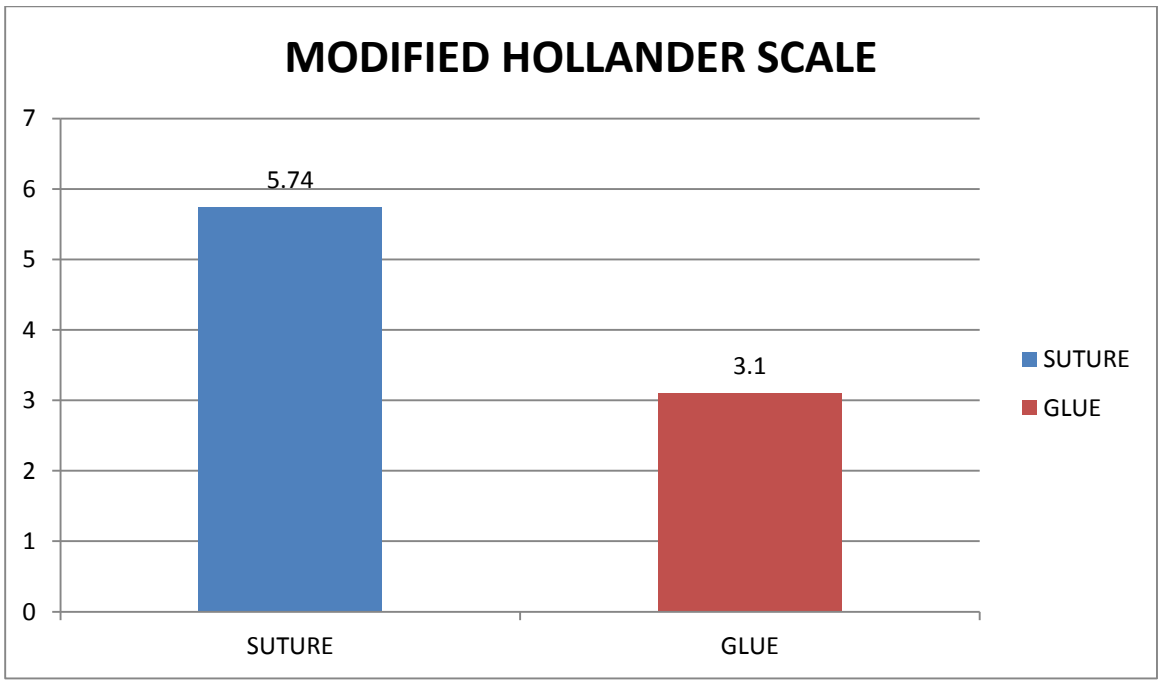
TABLE-10

COMPARISION OF COSMESIS AMOUNG STUDY GROUP:

	SUTURE	N	Mean	Std. Deviation	Std. Error Mean	t value
MODIFIED HOLLANDER SCALE	SUTURE	50	5.7400	.69429	.09819	16.070**
	GLUE	50	3.1000	.93131	.13171	

**P<0.001

FIGURE-34



Above table depicts the wound cosmesis score for both skin and suture group with mean value of 3.1 and 5.74 respectively. The p value is of significant being <0.001.

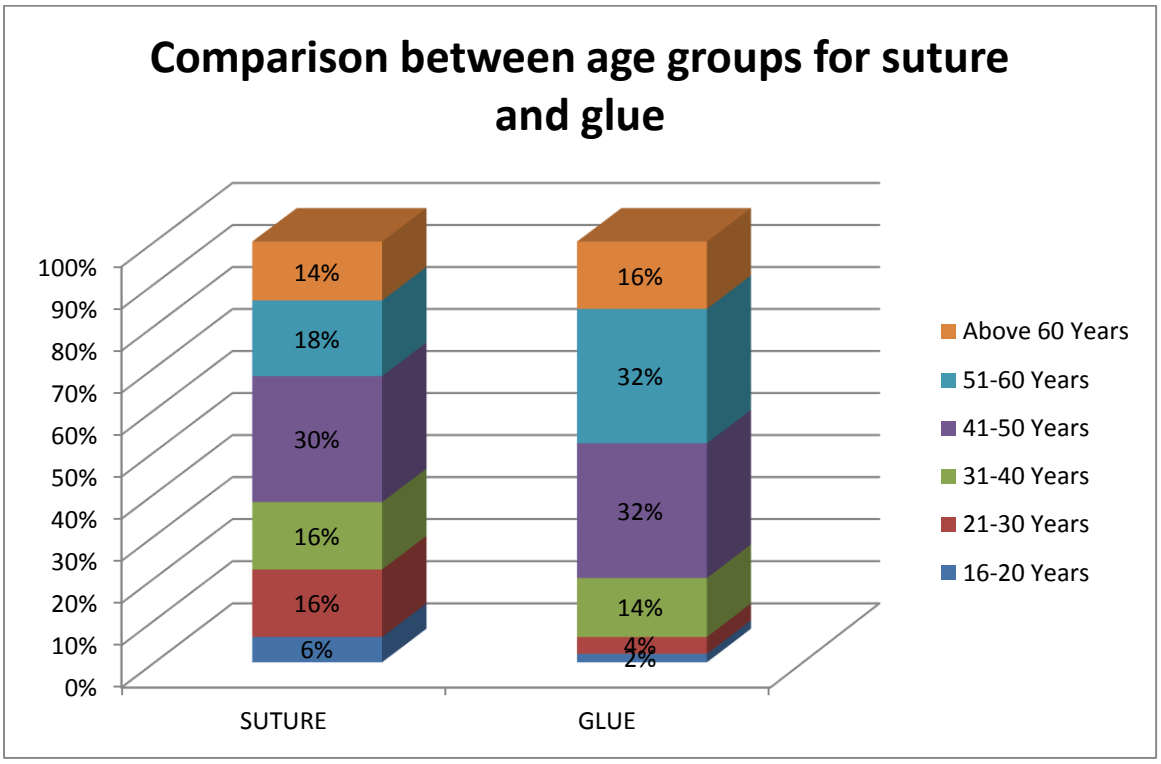
TABLE-11

COMPARISON OF AGE AND GENDER AMONG GROUP:

			SUTURE		Total
			SUTURE	GLUE	
age group	16-20 Years	Count	3	1	4
		% within SUTURE	6.0%	2.0%	4.0%
	21-30 years	Count	8	2	10
		% within SUTURE	16.0%	4.0%	10.0%
	31-40 years	Count	8	7	15
		% within SUTURE	16.0%	14.0%	15.0%
	41-50 years	Count	15	16	31
		% within SUTURE	30.0%	32.0%	31.0%
	51-60 years	Count	9	16	25
		% within SUTURE	18.0%	32.0%	25.0%
	Above 60 years	Count	7	8	15
		% within SUTURE	14.0%	16.0%	15.0%
Total		Count	50	50	100
		% within SUTURE	100.0%	100.0%	100.0%

In the above table it is observed that the mean age group amoung both skin glue and suture group is studied. The mean age group for skin glue is 41-50 yrs and for skin suture group also it is 41-50 yrs. This difference is of no significance and hence age group does not have any effect on this study.

FIGURE -35



In the above table it is observed that the mean age group amoug both skin glue and suture group is studied. The mean age group for skin glue is 41-50 yrs and for skin suture group also it is 41-50 yrs. This difference is of no significance and hence age group does not have any effect on this study.

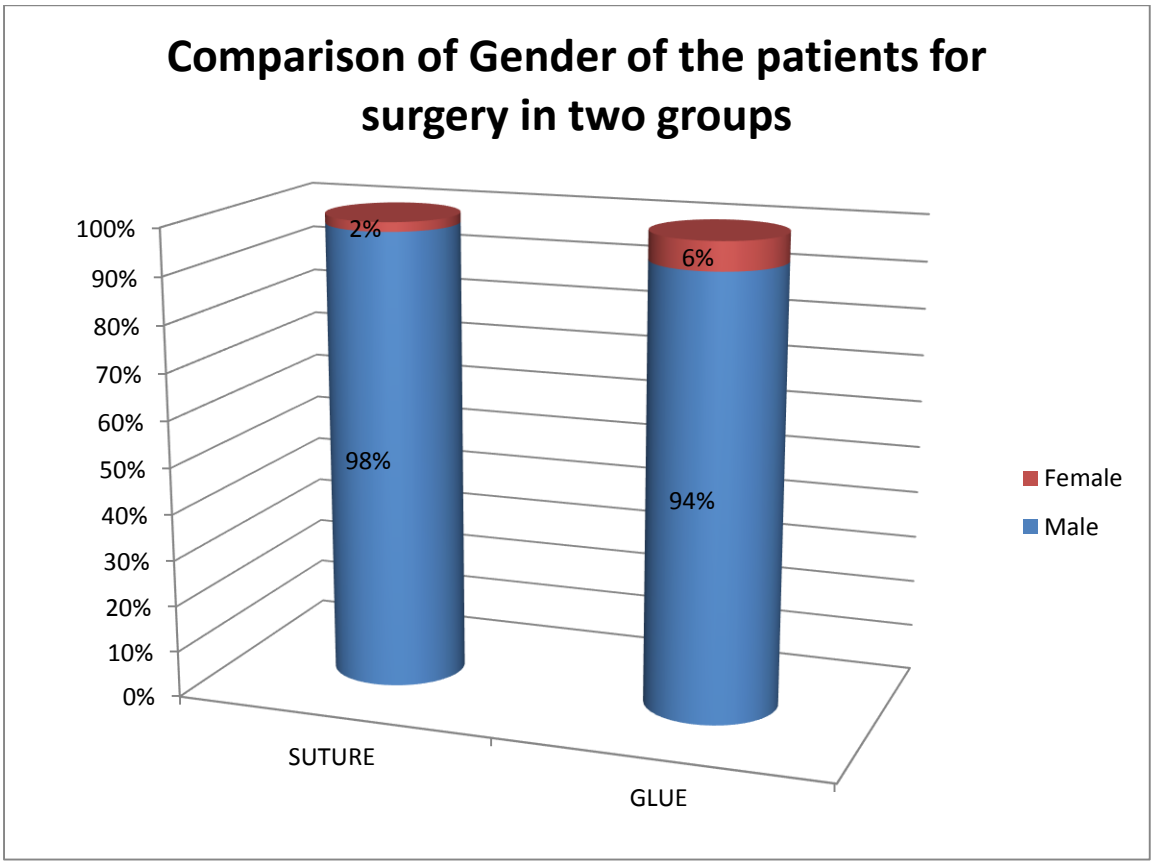
TABLE-12

COMPARISON OF GENDER AMOUNG SKIN GLUE AND SUTURE GROUP

			SUTURE		Total
			SUTURE	GLUE	
sex	Male	Count	49	47	96
		% within SUTURE	98.0%	94.0%	96.0%
	Female	Count	1	3	4
		% within SUTURE	2.0%	6.0%	4.0%
	Total	Count	50	50	100
		% within SUTURE	100.0%	100.0%	100.0%

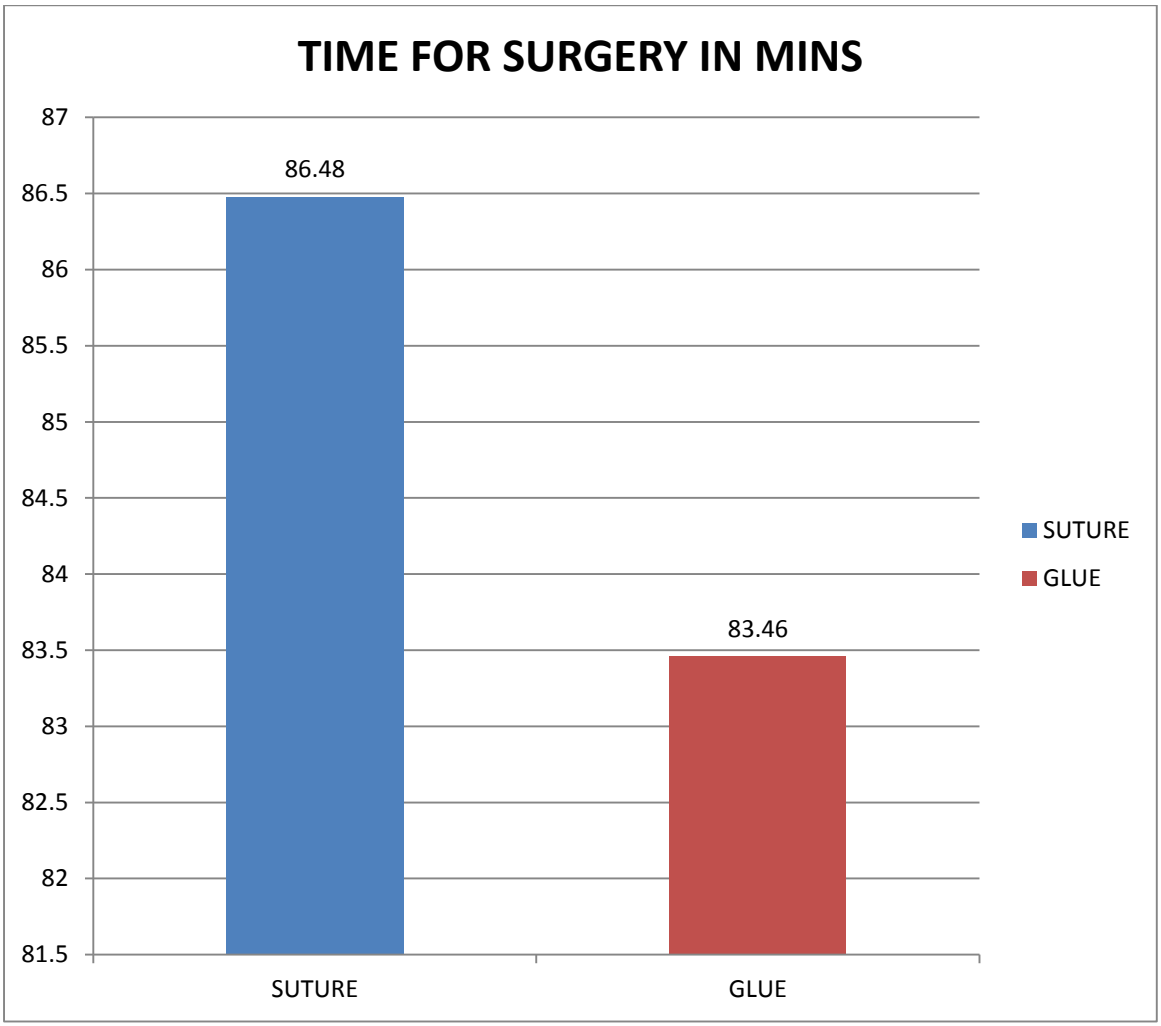
Above table shows the gender population among study group. The mean gender group for suture group is 98% for male and for female it is 2%. For skin glue group the mean gender is 94% for male and 6% for female. This difference is of no significance and hence it is concluded that gender does not affect the study group

FIGURE -36



Above table shows the gender population among study group. The mean gender group for suture group is 98% for male and for female it is 2%. For skin glue group the mean gender is 94% for male and 6% for female. This difference is of no significance and hence it is concluded that gender does not affect the study group

FIGURE -37



Above chart indicates the time taken for surgery among study group. The mean time taken for surgery in suture group is 86.48 and for skin glue group it is 83.46.

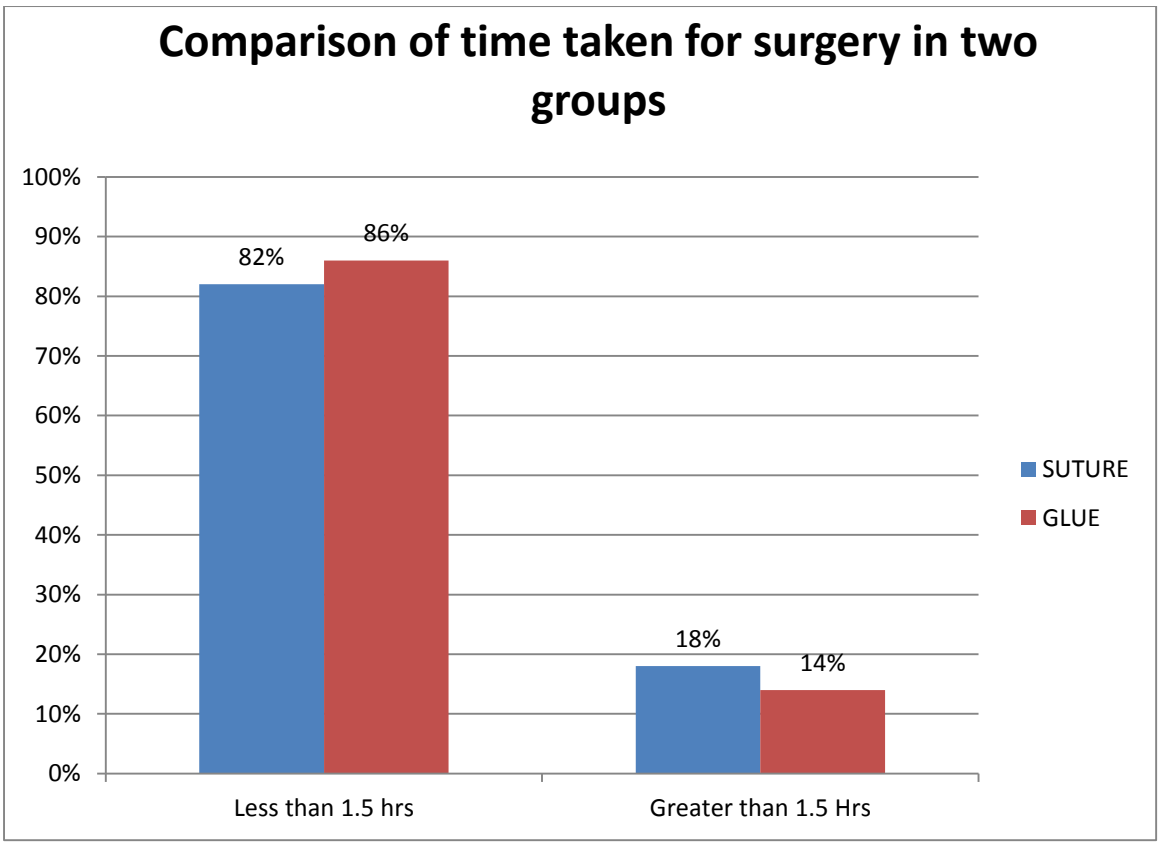
TABLE-13

COMPARISON OF TIME TAKEN FOR SURGERY AMUONG STUDY GROUP:

time surgery hrs * SUTURE Crosstabulation					
			SUTURE		Total
			SUTURE	GLUE	
time surgery hrs	Less than 1.5 hrs	Count	41	43	84
		% within SUTURE	82.0%	86.0%	84.0%
	Greater than 1.5 hrs	Count	9	7	16
		% within SUTURE	18.0%	14.0%	16.0%
Total		Count	50	50	100
		% within SUTURE	100.0%	100.0%	100.0%

Above table indicates time taken for surgery among study group. Time taken for surgery is divided into greater than 1.5 hrs and less than 1.5 hrs. in both groups .In both groups percentage of skin glue and suture group involved is studied.

FIGURE -38



In the present study it is observed that in greater than 1.5hrs percentage of skin suture is 82% and for skin glue group it is 86%. For less than 1.5 hrs group the percentage is 18% and 14% for suture and skin glue group respectively.

DISCUSSION

DISCUSSION

Approximation of skin incision in wound closure technique is essential for a good cosmetic and functional result. The main goal of all wound closure technique is to approximate the wound edges without disturbing the natural process of healing. Tradionally, skin closure technique was performed with suture material because of cost effectiveness and availability. But current trend runs towards a faster, comfortable and cosmetically better technique. Suture material remains standard material for skin closure, but however use of suture material is associated with postoperative pain and one have to come for suture removal which in turn causes anxiety or pain. Since suture material is associated with puncture site near the wound edge, there is high chance of microbial invasion which in turn leads on to surgical site infection.

Needle stick injury is highly associated with suture material and hence there is high chance of transmission of HIV and other diseases. Despite all shortcomings of suture material technique, it still retains the maximum tensile strength.

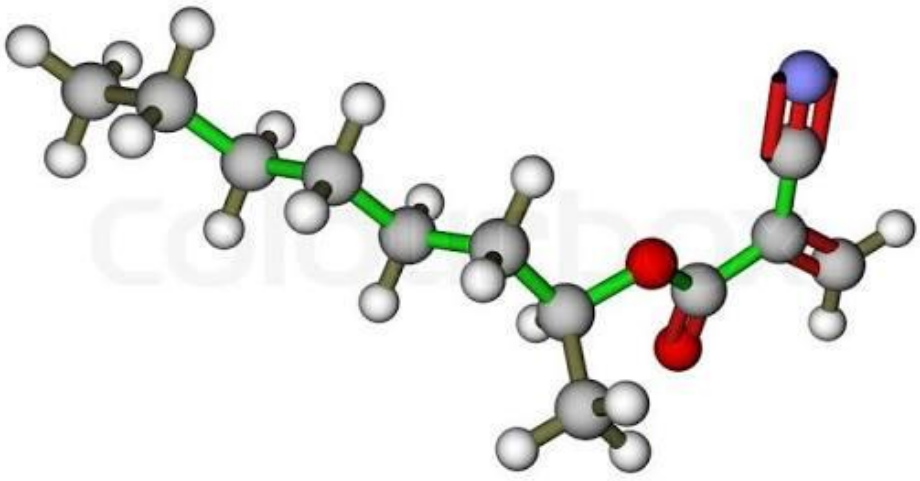
Again coming onto stapler device, application is faster, associated with lowest rate of tissue reaction and infection. However these stapler device do not produce meticulous closure and removal of staples produces pain.

Surgical tapes which is used for wound closure technique is least inducers of tissue reactivity but however it requires the use of adhesive adjuncts like tincture of benzoin which increases the local induration and skin toxicity.

An ever ending research for a material to overcome the shortcomings of various closure technique led to discovery of skin adhesive glue (octylcyanoacrylate).

Tissue adhesive were discovered in 1949 but clinically it came into surgeons practice in 1959. In earlier generation short carbon atoms were used which results in faster degradation and producing toxic products. cyanoacrylate are topical adhesive glues that forms bond over outer surface of skin. It contains long chain plascticizer and forms strong flexible bond.

FIGURE -39 -3D STRUCTURE OF OCTYLCYANOACRYLATE



AGE :

In a study conducted by MATIN.S.F 50 patients were closed with octylcyanoacrylate and 42 patients closed with skin suturing . The mean age for skin glue group were 52.5 and for skin suturing group it was 51. In the present study 50 patient closed with skin glue and 50 patients with suture. The mean age group for skin glue group is 30 and for suturing group is 32. However the difference in age groups between two categories were statistically not significant.

SEX:

In MATIN.S.F study, it is observed that the sex ratio (male to female) for adhesive group (1.85) and for suturing group (1.078). In the present study male and female patients for suture group is 98% and 2%. For skin glue it was 94% and 6% for male and female respectively. Again sex population was not thought to have any effect on the results.

FIGURE -40 SKIN GLUE APPLICATION:

FIGURE – 41 SUTURE GROUP AT 2 WEEKS :

TIME TAKEN FOR SKIN CLOSURE:

In one of the published studies of octylcyanoacrylate of quin.J.et al, use of adhesive glue was found to be significantly faster (220 seconds versus 744 seconds ; $p<0.001$). In MATIN.S.F study, the mean time taken for skin closure in adhesive glue group is faster than skin suturing group (150 seconds versus 360 seconds). In the present study, the mean time taken for skin closure is studied in minutes. The mean time taken for adhesive glue is 4.88 minutes ±1.53 and for skin suturing group the mean time taken is 2.72 minutes ±1.32. This difference in minimum time taken of skin closure for adhesive group if great significant with p value <0.001.

POSTOPERATIVE PAIN :

The postoperative pain for both skin glue and skin suturing is compared at 0hrs, 12hrs, 48hrs, 72hrs and 7^{th} postoperative day. Postoperative pain is assessed using visual analogue scale. In the present study it is observed that postoperative pain is less during early postoperative hours and late postoperative hrs. several studies such as Quin.J. etal have compared postoperative pain and shown that less postoperative pain in adhesive glue group but of no significance. In the present study it is seen that postoperative is less with skin glue group than with suturing tech niques. This difference is of great significance with p value <0.001.

FIGURE -42 -POSTOP PIC OF SKIN GLUE AT 2 WEEKS:

FIGURE- 43-POSTOP PIC OF SUTURE GROUP AT 2WEEKS:

WOUND ASEPSIS SCORE:

Postoperative wound infection is assessed using ASEPSIS SCORE for first 5 days of postoperative period. The parameters noted during the study is seroma, erythema, purulent discharge, separation of wound and each parameters score 1-5 for first 5 days of postoperative period. Earlier published studies Singer .J.,etal., shows that infection rate at the end of 1 week were similar and fewer cases of adhesive glue were erythematous. In the present study it is observed that , seroma and erthema are more commonly seen with skin suturing group than adhesive glue group .This difference is of great significance with p value <0.001.

POSTOPERATIVE SCAR:

Postoperative scar following skin closure with adhesive glue and skin suturing is studied using Vancouver scar scale. Vancouver scar scale is burn scar scale which studies five parameters such as pigmentation, pliability, scar height, colour and vascularity. Score ranges from 0-13. In the present study it is observed that hyperpigmentation with increased scar height and band like texture is associated with skin suturing group. Adhesive glue group is associated with less pigmentation, normal skin colour and pliable skin. The difference is of great significance with p value <0.001.

WOUND COSMESIS SCORE:

The outcome of wound is assessed with Modified Hollander scale at various intervals. This scale allows assessment of four parameters with patient and observer satisfaction score. Edge inversion, step off border, contour irregularities, margin separation and excessive distortion. The study conducted by Toriumi.D.M.,etal., observed wound using modified Hollander scale and later by visual analogue scale and revealed equivalent results with Modified Hollander scale. In the present study early results is in favour of Adhesive glue and later follow upshows significant difference. Adhesive glue had got good cosmetic than with skin suturing.

CONCLUSION

CONCLUSION

The present study is done to com pare the skin closure technique with Adhesive skin and skin suturing material. The concept of Adhesive skin glue is superior to skin suturing due to following properties:

1. Faster, comfortable and cosmetically better.
2. Time taken for skin closure is shorter which in turn reduces operating time.
3. It provides flexible, water resistant and sealed skin closure.
4. It forms water tight barrier and allows the patient to take shower at any time.
5. Stitches need not be removed.
6. No need to apply bandages.
7. Reduced postoperative pain.
8. It disappears naturally as incision heals and leaves no mark.
9. It is non- irritant and can be safely applied.

Therefore it is concluded that Octylcyanoacrylate can be used in surgical skin closure in clean elective surgeries.

SUMMARY

SUMMARY

The present study is conducted in 100 patients to compare the efficacy and cosmesis of skin closures with Adhesive skin glue and skin suturing group. The study is conducted in patient undergoing clean elective surgery . It is done in patient who gets admitted in RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL with inguinal hernia.

100 patients were selected and they were divided as two groups as gruop1 and group 2. Group 1 patients were applied with Adhesive glue for skin closure and Group 2 patients with suture material. Patient were included in the study based on criteria such as patient >12yr and <70yrs, unilateral or bilateral hernia . patient were excuded on the basis of Age <12yr and >70 yr ,previous hernia repair, Diabetic and immunocompromised individual and patients with skin disease in operating area.

In the present study, the mean time taken for skin closure in Adhesive glue is much faster than skin suturing group (4.88 minutes versus 2.7 minutes) which is of great significance with p value <0.001.

In both groups postoperative pain is assessed at 0hrs, 12hrs, 48hrs, 72hrs and 7^{th} postoperative day. There is significant less pain with Adhesive glue group in the early hours and during late hours the postoperative pain is of less significance.

Wound infections assessed at various intervals with ASEPSIS SCORE .Maximum number of wound complications such as seroma and erythema is associated with skin suturing group. The results is in favor of Adhesive glue which is of great significant.

The outcome of wound is assessed with Modified Hollander scale.at varying intervals. wound cosmesis is better achieved with Adhesive glue group with great significance of p value <0.001. Postoperative scar is studied using Vancouver scar scale. It allows assessment of five parameter such as pigmentation, pliability, colour, scar height and vascularity. cosmesis is best achieved with Adhesive glue group with great significance of p valve <0.001.

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Stillman RM, Bella FJ, Seligman SJ, Skin Wound Closure: The effect of various wound closure methods on susceptibility to infection. Arch Surgery, 1980; 115:674-680.
2. Iavazzo C, Gkegkes ID, Vouloumangu EK, Mamais I, Peppas G, Falagas ME. Randomized controlled trial for suture vs. stapler for management of surgical wounds. Am Surg. 2011 Sep; 77(9): 1206-21.
3. Eldrup Randomized controlled trial compared stapler with conventional skin closure.
4. Ritchie AJ et al carried out a prospective double blind randomized study comparing staples versus sutures in the closure of scalp wound and found that stapling was significantly faster and less painful.
5. Stockley I, ElsoEldrup J, Wied U, Andersen B. Randomised trial comparing Proximate stapler with conventional skin closure. Acta Chir Scand. 1981; 147(7): 501–502.
6. Stillman RM, Bella FJ, Seligman SJ, Skin Wound Closure: The effect of various wound closure methods on susceptibility to infection. Arch Surgery, 1980; 115:674-679.

7. Iavazzo C, Gkegkes ID, Vouloumangu EK, Mamais I, Peppas G, Falagas ME. Randomized controlled trial for suture vs. stapler for management of surgical wounds. Am Surg. 2011 Sep; 77(9):1206-21.
8. Medina dos Santos LR, Freitas CAF, Hojaji FC et al. Prospective study using skin staplers in head and neck surgery. AM J Surg. 1995; 170451-452.
9. George TK, Simpson DC. Skin wound closure with staples in the Accident and Emergency Department. J R Coll Surg Edinb 1985; 30:54. [10] Kanegaye JT, Vance CW, Chan L, Schonfeld N. Comparison of skin stapling devices and standard sutures for pediatric scalp lacerations: a randomized study of cost and time benefits. J Pediatr 1997; 130:808. 1 [10] Kanegaye JT, Vance CW, Chan L, Schonfeld N. Comparison of skin stapling devices and standard sutures for pediatric scalp lacerations: a randomized study of cost and time benefits. J Pediatr 1997; 130:808.
10. Galli SKD, Constantinides M (2011) Wound closure technique http://emedicine.medscape.com/article/1836438 Accessed 9 May 2011
11. Coover HN, Joyner FB, Sheerer NH (1959) Chemistry and performance of Cyanoacrylate adhesive: special technical papers. 5:413-417.

12. Schwade ND (2008) Wound adhesives, 2Octylcyanoacrylate .

13. DraguA, Unglaub F, Schwarz S, et al (2009) Foreign body reaction after usage of tissue adhesives for skin closure: a case report and review of the literature. Arch Orthop Trauma Surg 129:167–169.

14. Terhune M (2009) Materials for wound closure.

15. Borley N.R, Mortensen N.J. (2001) Topical adhesive as a wound dressing for elective abdominal surgery: Ann R CollSurg Engl. 80(4):285-286.

16. Mertz PM, Davis SC, Cazzaniga AL, et al (2003) Barrier and antibacterial properties of 2-octyl cyanoacrylate derived wound treatment films: J Cutan Med Surg. 7(1):1-6 8. 9.

17. Quinn J, Wells G, Sutcliffe T, Jarmuske M, Maw J, Stiell I, Johns P (1998) Tissue adhesive versus suture wound repair at 1 year: randomized clinical trial correlating early, 3-month, and 1-year cosmetic outcome. Ann Emerg Med 32(6):645-649 .

18. Matin SF (2003) Prospective Randomized Trial of Skin Adhesive versus Sutures for closure of 217 laparoscopic port-site incisions. J Am CollSurg 196(6): 845-853 10.

19. Ongccp , Jacobsen AS, Joseph VT (2002) Comparing wound closure using tissue glue versus subcuticular suture for pediatric

surgical incisions: a prospective, randomised trial. PediatrSurgInt 18:553–555 11.

20. Arunachalam P, King PA, Oxford J (2003) A Prospective comparison of tissue glue versus sutures for circumcision. Pediatr Surg Int 19(1-2):18-19 12.

21. Quinn J, Wells G, Sutcliffe T, Jarmuske M, Maw J, Stiell I, Johns P (1997) A Randomized trial comparing octyl cyanoacrylate tissue adhesive and sutures in the management of lacerations. J Am Med Assoc 277(19):1527-1530 S

ANNEXURE

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI 600 003

EC Reg.No.ECR/270/Inst./TN/2013
Telephone No.044 25305301
Fax: 011 25363970

CERTIFICATE OF APPROVAL

To
Dr.A.Anbuselvi
Post Graduate in MS General Surgery
Institute of General Surgery
Madras Medical College
Chennai 600 003

Dear Dr.A.Anbuselvi,

The Institutional Ethics Committee has considered your request and approved your study titled **"A COMPARATIVE STUDY OF ADHESIVE GLUE WITH SUTURE MATERIAL FOR SKIN CLOSURE IN OPEN INGUINAL HERNIA REPAIR AT RGGGH" - NO.23012017 (II).**

The following members of Ethics Committee were present in the meeting hold on **19.01.2017** conducted at Madras Medical College, Chennai 3

1.Dr.C.Rajendran, MD.,	:Chairperson
2.Dr.M.K.Muralidharan,MS.,M.Ch.,Dean, MMC,Ch-3	:Deputy Chairperson
3.Prof.Sudha Seshayyan,MD., Vice Principal,MMC,Ch-3	: Member Secretary
4.Prof.B.Vasanthi,MD., Prof.of Pharmacology.,MMC,Ch-3	: Member
5.Prof.A.Rajendran,MS, Prof. of Surgery,MMC,Ch-3	: Member
6.Prof.N.Gopalakrishnan,MD,Director,Inst.of Nephrology,MMC,Ch	: Member
7.Prof.Baby Vasumathi,MD.,Director, Inst. of O & G	: Member
8.Prof.K.Ramadevi,MD.,Director,Inst.of Bio-Che,MMC,Ch-3	: Member
9.Prof.R.Padmavathy, MD, Director,Inst.of Pathology,MMC,Ch-3	: Member
10.Prof.S.Mayilvahanan,MD,Director, Inst. of Int.Med,MMC, Ch-3	: Member
11.Tmt.J.Rajalakshmi, JAO,MMC, Ch-3	: Lay Person
12.Thiru S.Govindasamy, BA.,BL,High Court,Chennai	: Lawyer
13.Tmt.Arnold Saulina, MA.,MSW.,	:Social Scientist

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

Member Secretary – Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

STUDY PROFORMA

PATIENT DETAILS:

Name: Age: Sex:

IP No. :
DOA:
DOS:?
DOD:
DIAGNOSIS:
Main complaints;

Comorbid Illness: Diabetic / Allergic skin disease/ Allergic drug history

CLINICAL EXAMINATION:

Pulse : BP :
RR : Temp :
Pallor : Icterus :
CVS : RS :
P/A : CNS:

INVESTIGATIONS :

CBC/RFT				
TC				
DC				
Hb %				
PCV				
RBC				
Platelets				
Glucose				
Urea				
Creatinine				
Na^+/K^+				

CXR:

Abdomen Xray:

HbsAg :

Hcv:

HIV:

TREATMENT; OPERATIVE MANAGEMENT .

1. Surgery details:

2. Time taken for surgery:

3. Time taken for skin closure:

POST OP PERIOD

1. Wound infection [asepsis score]:

2. Wound dehiscence:

3. Pain at wound site [visual analogue scale]:

FOLLOW UP 1. Wound cosmesis score [hollander scale]

2. Scar integrity [vancouver scale]

INFORMATION SHEET

A COMPARATIVE STUDY OF ADHESIVE GLUE WITH SUTURE MATERIAL(3-0 ETHYLON) FOR SKIN CLOSURE IN OPEN INGUINAL HERNIA REPAIR AT RGGGH"

Name of Investigator : **Dr.A.ANBUSELVI**. Name of Participant :
Purpose of Research : To study the efficacy of adhesive glue and suture material (3-0 ethylon)thereby reducing operating time, decreasing postoperative pain and less infection .

Study Design : Prospective (Observational Study)

Study Procedures : Patient will be divided into two groups Group 1 and Group 2.Suture material and skin glues will be applied respectively . Two groups will be monitored for time required for skin closure , postoperative pain and wound infections and data analysed.

Possible Risks : No risks to the patient

Possible benefits

To patient : Since adhesive glue came into clinical practice which have less post-operative pain ,better cosmesis and less wound infection patient may be benefited with outcome.

To doctor & to other people : Based on outcome monitored, suture techniques which have less post-operative pain , less infection and reduced time requirement , good scar and better cosmesis will be very helpful .

Confidentiality of the information obtained from you : The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared

Can you decide to stop participating in the study : Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time

How will your decision to not participate in the study affect you : Your decision will not result in any loss of benefits to which you are otherwise entitled.

Signature of Investigator Signature of Participant

Date :
Place :

PATIENT CONSENT FORM

Study Detail : **A COMPARATIVE STUDY OF ADHESIVE SKIN GLUE, SKIN STAPLERS WITH SUTURE FOR SKIN CLOSURE IN EMERGENCY LAPARATOMY IN RGGGH.**

Study Centre : Rajiv Gandhi Government General Hospital, Chennai.

Patient's Name :

Patient's Age :

In Patient Number :

Patient may check (☑) these boxes

I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask question and all my questions and doubts have been answered to my complete satisfaction.	❑
I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving reason, without my legal rights being affected.	❑
I understand that sponsor of the clinical study, others working on the sponsor's behalf, the Ethics committee and the regulatory authorities will not need my permission to look at my health records, both in respect of current study and any further research that may be conducted in relation to it, even if I withdraw from the study I agree to this access. However, I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from this study.	❑
I agree to take part in the above study and to comply with the instructions given during the study and faithfully cooperate with the study team and to immediately inform the study staff if I suffer from any deterioration in my health or well being or any unexpected or unusual symptoms.	❑
I hereby consent to participate in this study	❑
I hereby give permission to undergo complete clinical examination and diagnostic tests including hematological, biochemical, radiological tests and to undergo treatment	❑

Signature/Thumb impression

Patient's Name and Address:

Signature of Investigator

Study Investigator's Name:

DR. A.ANBUSELVI,

URKUND

Urkund Analysis Result

Analysed Document: SKIN CLOSURE - FINAL.docx (D31290114)
Submitted: 10/13/2017 1:17:00 PM
Submitted By: anbuslv13@gmail.com
Significance: 2 %

Sources included in the report:

01.docx (D31089414)
suresh sir.docx (D31086602)
Dissertation FINAL-1.pdf (D31274988)
DISSERTATION.docx (D22508517)

Instances where selected sources appear:

7

PLAGIARISM CERIFICATE

This is to certify that this dissertation work titled **"A COMPARATIVE STUDY OF ADHESIVE GLUE WITH SUTURE MATERIAL (3-0 ETHYLON) FOR SKIN CLOSURE IN OPEN INGUINAL REPAIR AT RGGGH"** of the candidate **DR.A.ANBUSELVI** with registration Number **221511002** for the award of **M.S** in the branch of **GENERAL SURGERY**. I personally verified the urkund.com website for the purpose of plagiarism Check. I found that the uploaded thesis file contains from introduction to conclusion pages and result shows **2 percentage** of plagiarism in the dissertation.

Guide & Supervisor sign with Seal.

MASTER CHART

S.No	NAME	AGE	IP No	DIAGNOSIS	PROCEDURE	TIME FOR CLOSURE	POSTOPERATIVE PAIN						ASEPSIS SCORE	MODIFIED HOLLANDER SCALE	VANCOUVER SCAR SCALE	SUTURE	GLUE	TIME FOR SURGERY
1	JEYARAMAN	45	30060	LHT INGUINAL HERNIA	LHT HERNIOPLASTY	6	4	7	5	4	2	2	2	6	8	+	-	1 hr30 min
2	THOMBARASAN	45	30013	LHT INGUINAL HERNIA	LHT HERNIOPLASTY	4	3	4	4	3	2	1	1	4	4	-	+	1hr 45 min
3	THOMBARASAN	55	32777	B/L INGUINAL HERNIA	B/L HERNIOPLATY	10	5	8	6	5	3	2	4	5	9	+	-	2hr 20 min
4	RAGHU	37	30297	RHT INGUINAL HERNIA	RHT HERNIOPLASTY	3	4	5	4	3	3	1	1	3	3	-	+	1hr 15min
5	HONESTRAJ	27	33095	RHT INGUINAL HERNIA	RHT HERNIOPLASTY	5	5	6	6	4	3	3	3	6	7	+	-	1hr
6	SENTHAMARAI	55	33850	RHT IH	RHT HERNIOPLASTY	4	3	4	4	3	2	2	2	5	2	-	+	45min
7	MURUGAN	45	35346	LHT IH	LHT HERNIOPLASTY	6	5	7	5	4	3	2	4	7	8	+	-	2hr 20 min
8	PERUMAL	75	35335	B/L INGUINAL HERNIA	B/L HERNIOPLATY	9	5	5	4	4	2	2	3	4	4	-	+	2hr 30 min
9	JEYAVELU	40	38040	B/L INGUINAL HERNIA	B/L HERNIOPLATY	11	6	7	6	4	3	3	4	5	9	+	-	1hr 15min
10	DAMODARAN	65	35441	LHT IH	LHT HERNIOPLASTY	3	4	4	3	3	2	1	2	3	3	-	+	1hr 20 min
11	VENKATESH	25	38280	RHT IH	RHT HERNIOPLASTY	5	5	6	5	4	3	3	3	6	8	+	-	1hr 40 min
12	THANGARAJ	42	38236	LHT IH	LHT HERNIOPLASTY	5	4	3	3	3	2	1	1	4	2	-	+	1hr 18 min
13	MANICKAM	47	35360	LHT IH	LHT HERNIOPLASTY	6	5	6	6	5	4	3	4	5	9	+	-	1 hr 20 min
14	NAGARAJ	29	37924	RHT IH	RHT HERNIOPLASTY	4	4	4	3	3	2	1	2	4	3	-	+	1 hr 10 min
15	RAJA	35	35380	RHT IH	RHT HERNIOPLASTY	7	5	7	6	5	4	3	4	6	10	+	-	1 hr 25 min
16	SOUNDAR	58	92843	RHT IH	RHT HERNIOPLASTY	4	4	4	3	3	2	1	0	3	4	-	+	1 hr 20 min
17	SATHYAKUMAR	25	45204	LHT IH	LHT HERNIOPLASTY	6	6	5	5	4	3	2	3	5	7	+	-	1 hr 15 min
18	VENKATRAMAN	52	45228	LHT IH	LHT HERNIOPLASTY	2	3	4	4	3	3	2	1	4	2	-	+	1 hr 10 min
19	MOHAN	59	45248	RHT IH	RHT HERNIOPLASTY	4	5	5	4	3	3	2	2	6	8	+	-	1 hr 19 min
20	SADHASIVAM	50	45166	B/L INGUINAL HERNIA	B/L HERNIOPLATY	3	3	4	3	3	2	1	0	3	3	-	+	2 hr 25 min
21	RAMESH	32	47853	LHT IH	LHT HERNIOPLASTY	5	5	6	5	4	3	2	3	7	9	+	-	1 hr 10 min
22	DURAI	34	47862	RHT IH	RHT HERNIOPLASTY	2	3	4	3	3	2	1	2	4	2	-	+	1 hr 20 min
23	THANGADURAI	37	49272	RHT IH	RHT HERNIOPLASTY	4	5	5	4	4	3	2	4	6	8	+	-	1 hr 15 min
24	RAVICHANDAR	43	49243	RHT IH	RHT HERNIOPLASTY	3	4	4	3	3	2	2	1	3	3	-	+	1 hr 15 min
25	ABUBAKKAR	16	50445	LHT IH	LHT HERNIOPLASTY	5	6	5	5	4	4	3	3	5	7	+	-	1 hr 19 min
26	MUNUSAMY	34	50396	RHT IH	RHT HERNIOPLASTY	2	3	4	4	3	3	2	1	4	3	-	+	1 hr 12 min
27	CHELLAMUTHU	30	50559	RHT IH	RHT HERNIOPLASTY	4	6	6	5	4	3	2	4	6	9	+	-	1 hr 18 min
28	JAYAKUMAR	57	50360	LHT IH	LHT HERNIOPLASTY	3	4	3	3	2	2	1	0	4	2	-	+	1 hr 20 min
29	CHINNAPPAN	65	50676	LHT IH	LHT HERNIOPLASTY	5	5	5	5	4	4	3	3	5	8	+	-	1 hr 25 min
30	SUBASH	34	51922	RHT IH	RHT HERNIOPLASTY	3	4	4	3	2	2	1	1	3	3	-	+	1 hr 13min
31	MOHANAVEL	54	53638	LHT IH	RHT HERNIOPLASTY	4	7	6	6	5	4	3	2	6	7	+	-	1 hr 20 min
32	THANGASAMY	40	53642	RHT IH	RHT HERNIOPLASTY	2	3	4	3	3	3	2	0	4	4	-	+	1 hr 15 min
33	GOPI	38	55972	RHT IH	RHT HERNIOPLASTY	5	6	6	5	5	4	3	3	7	9	+	-	1 hr 18 min
34	KRISHNAN	20	55907	LHT IH	LHT HERNIOPLASTY	3	5	4	3	3	2	1	1	3	3	-	+	1 hr 20 min
35	DURAI	58	56028	B/L INGUINAL HERNIA	B/L HERNIOPLATY	6	6	6	5	4	3	2	4	6	8	+	-	2 hr 15 min
36	RAMASAMY	60	55945	LHT IH	LHT HERNIOPLASTY	3	4	4	4	3	3	3	1	4	2	-	+	1 hr 17 min
37	SIVALINGAM	45	58511	LHT IH	LHT HERNIOPLASTY	4	6	5	5	4	3	2	2	5	7	+	-	1 hr 10 min
38	THANIKACHALA	60	58650	RHT IH	RHT HERNIOPLASTY	2	4	4	4	3	2	1	0	3	3	-	+	1 hr 15 min
39	SHANKAR	45	58632	B/L INGUINAL HERNIA	B/L HERNIOPLATY	3	7	6	6	5	4	3	3	6	9	+	-	1 hr 19 min
40	SIVARAJ	80	59512	RHT IH	RHT HERNIOPLASTY	2	5	4	4	3	3	2	1	4	2	-	+	1 hr 20 min
41	PONNUSAMY	74	61217	RHT IH	RHT HERNIOPLASTY	4	6	5	5	3	3	2	4	5	8	+	-	1 hr 15 min
42	NATESAN	45	58583	RHT IH	RHT HERNIOPLASTY	3	3	4	3	3	2	1	0	3	3	-	+	1 hr 25 min
43	SESHAGIRI	20	66760	RHT IH	RHT HERNIOPLASTY	5	5	5	5	4	3	2	3	6	8	+	-	1 hr 15 min
44	NATRAJAN	68	66750	B/L INGUINAL HERNIA	B/L HERNIOPLATY	4	4	3	3	2	2	1	2	4	4	-	+	2 hr 20 min
45	KANNAN	42	70180	B/L INGUINAL HERNIA	B/L HERNIOPLATY	6	6	6	5	4	4	3	4	5	9	+	-	2 hr 27 min
46	THAHAMOIDEN	68	70185	LHT IH	LHT HERNIOPLASTY	3	4	4	3	2	2	2	1	3	2	-	+	1 hr 15 min
47	SUNDARAM	69	71814	RHT IH	RHT HERNIOPLASTY	4	5	4	4	4	3	2	2	7	10	+	-	1 hr 14 min
48	MOHAN	38	72987	RHT IH	RHT HERNIOPLASTY	2	4	3	3	2	2	1	0	4	3	-	+	1 hr 12 min
49	KRISHNAN	68	73145	LHT IH	LHT HERNIOPLASTY	5	5	6	5	4	3	2	3	6	7	+	-	1 hr 19 min
50	SELVARAJ	47	73146	RHT IH	RHT HERNIOPLASTY	3	3	3	2	2	2	1	1	3	3	-	+	1 hr 15 min

51	RAHU	60	70836	B/L INGUINAL HERNIA	B/L HERNIOPLATY	6	6	6	5	5	4	3	4	6	8	+	-	2 hr 18 min
52	RAJENDRAN	48	76171	LHT IH	LHT HERNIOPLASTY	2	4	4	3	3	2	1	1	4	2	-	+	1 hr 25 min
53	THANDAPANI	47	77681	RHT IH	RHT HERNIOPLASTY	4	5	4	4	3	3	2	3	7	9	+	-	1 hr 20 min
54	BOOPATHY	59	77237	LHT IH	LHT HERNIOPLASTY	3	4	3	3	3	2	1	0	5	3	-	+	1 hr 14 min
55	MANICKAM	70	83570	B/L INGUINAL HERNIA	B/L HERNIOPLATY	7	6	6	5	5	3	2	4	6	8	+	-	2 hr 20 min
56	SUBRAMANI	55	85854	RHT IH	RHT HERNIOPLASTY	2	4	4	3	3	2	1	1	3	4	-	+	1 hr 17 min
57	SELVAM	45	85560	LHT IH	LHT HERNIOPLASTY	4	5	5	4	4	2	2	2	5	9	+	-	1 hr 13 min
58	KUMAR	44	85580	RHT IH	RHT HERNIOPLASTY	3	4	3	3	3	2	1	0	2	3	-	+	1 hr 16 min
59	VENKATESA	67	85582	B/L INGUINAL HERNIA	B/L HERNIOPLATY	6	6	5	5	5	4	3	3	6	8	+	-	1 hr 12 min
60	RAMU	50	86421	LHT IH	LHT HERNIOPLASTY	3	4	4	4	3	3	2	1	3	2	-	+	1 hr 10 min
61	RAMESH	35	86641	RHT IH	RHT HERNIOPLASTY	4	5	5	3	3	2	2	2	5	9	+	-	1 hr 14 min
62	KANNAN	39	86654	RHT IH	RHT HERNIOPLASTY	2	3	4	4	3	3	2	1	2	4	-	+	1 hr 12 min
63	ARUN	25	86658	LHT IH	LHT HERNIOPLASTY	5	5	5	5	4	3	2	3	6	8	+	-	1 hr 15 min
64	ASOHOKAN	49	87521	LHT IH	LHT HERNIOPLASTY	3	4	4	4	3	3	2	0	3	2	-	+	1 hr 12 min
65	BALAJI	23	87534	RHT IH	RHT HERNIOPLASTY	4	5	5	4	4	3	2	3	5	7	+	-	1 hr 15 min
66	GOWTHAM	28	87625	LHT IH	LHT HERNIOPLASTY	2	3	3	3	2	2	1	1	2	3	-	+	1 hr 12 min
67	HARIRAJAN	45	87821	RHT IH	RHT HERNIOPLASTY	4	5	4	4	3	3	2	4	6	9	+	-	1 hr 20 min
68	GOVINDHAN	48	88534	LHT IH	LHT HERNIOPLASTY	3	4	3	3	2	2	1	1	3	2	-	+	1 hr 22 min
69	GANESAN	49	88654	B/L INGUINAL HERNIA	B/L HERNIOPLATY	4	5	6	5	4	3	2	4	5	10	+	-	2 hr 22 min
70	CHINNAMMAL	55/F	88568	RHT IH	RHT HERNIOPLASTY	2	4	4	3	3	2	1	0	1	3	-	+	1 hr 17 min
71	RAVIPRASAD	46/M	88958	LHT IH	LHT HERNIOPLASTY	4	5	5	4	4	3	2	3	6	9	+	-	1 hr 14 min
72	PAPPATHY	48/F	89525	LHT IH	LHT HERNIOPLASTY	2	3	4	3	3	2	2	1	2	4	-	+	1 hr 16 min
73	NARAYANAN	56	89565	RHT IH	RHT HERNIOPLASTY	4	5	6	5	4	4	2	2	5	8	+	-	1 hr 12 min
74	MURUGESAN	55	89950	B/L INGUINAL HERNIA	B/L HERNIOPLATY	4	4	4	3	3	2	1	1	2	2	-	+	2 hr 22 min
75	SABARI	33	10563	LHT IH	LHT HERNIOPLASTY	5	6	6	5	4	3	2	3	6	9	+	-	1 hr 10 min
76	SHANMUGAM	48	11563	RHT IH	RHT HERNIOPLASTY	1	4	4	4	3	2	2	1	3	3	-	+	1 hr 14 min
77	VISHNU RAJ	26	11582	RHT IH	RHT HERNIOPLASTY	3	5	5	4	4	3	2	4	5	8	+	-	1 hr 11 min
78	AKBAR	58	11653	LHT IH	LHT HERNIOPLASTY	2	4	3	3	2	2	1	1	2	4	-	+	1 hr 12 min
79	KUPPAN	66	11687	RHT IH	LHT HERNIOPLASTY	4	6	5	5	4	3	2	3	7	9	+	-	1 hr 16 min
80	ANBU	55	11777	LHT IH	LHT HERNIOPLASTY	1	3	4	3	3	2	2	1	4	2	-	+	1 hr 10 min
81	MANIKANDAN	42	11586	LHT IH	LHT HERNIOPLASTY	4	5	5	4	4	3	2	4	5	8	+	-	1 hr 14 min
82	KOLANJI	68	11894	B/L INGUINAL HERNIA	B/L HERNIOPLATY	4	5	4	3	3	2	1	1	2	4	-	+	2 hr 28 min
83	POUNAMMAL	55/F	12535	LHT IH	LHT HERNIOPLASTY	4	4	4	3	3	2	1	2	6	10	+	-	1 hr 12 min
84	BALASUBRAMANI	45	12563	RHT IH	RHT HERNIOPLASTY	2	3	3	2	2	2	1	0	4	2	-	+	1 hr 14 min
85	KARTHICK	16	12534	RHT IH	RHT HERNIOPLASTY	5	5	4	4	4	3	2	3	5	9	+	-	1 hr 16 min
86	SIVA KUMAR	48	12654	LHT IH	LHT HERNIOPLASTY	1	3	3	3	2	2	1	1	3	3	-	+	1 hr 18 min
87	PRABHU	25	12867	RHT IH	RHT HERNIOPLASTY	3	4	5	4	3	3	2	4	7	7	+	-	1 hr 14 min
88	MURUGAMMAL	56	12898	RHT IH	RHT HERNIOPLASTY	1	3	4	3	3	2	1	0	2	2	-	+	1 hr 13 min
89	MEGANATHAN	58	12564	B/L INGUINAL HERNIA	B/L HERNIOPLATY	6	6	6	5	4	3	2	4	6	8	+	-	2 hr 30 min
90	KUNJAPPAN	67	13452	RHT IH	RHT HERNIOPLASTY	2	3	4	4	3	3	1	1	3	3	-	+	1 hr 14 min
91	JOTHILAKSHMI	45	13423	LHT IH	LHT HERNIOPLASTY	4	5	6	5	4	3	2	3	5	8	+	-	1 hr 10 min
92	ALAGESAN	58	13345	LHT IH	LHT HERNIOPLASTY	2	3	3	3	2	2	1	1	2	2	-	+	1 hr 10 min
93	SAMINATHAN	48	13567	RHT IH	RHT HERNIOPLASTY	4	4	5	4	4	3	2	2	6	9	+	-	1 hr 14 min
94	VELUSAMY	55	13328	RHT IH	RHT HERNIOPLASTY	1	3	4	3	3	2	1	0	3	4	-	+	1 hr 10 min
95	ANNADURAI	43	14231	LHT IH	LHT HERNIOPLASTY	3	5	5	4	3	3	2	3	5	8	+	-	1 hr 19 min
96	MANGAMMA	54/F	14532	RHTIH	RHT HERNIOPLASTY	1	4	3	3	3	2	1	2	1	2	-	+	1 hr 15 min
97	ABDULLA	58	14565	RHT IH	RHT HERNIOPLASTY	4	5	4	4	3	3	2	4	6	9	+	-	1 hr 10 min
98	PAKKIRISAMY	44	14654	LHT IH	LHT HERNIOPLASTY	2	3	3	3	2	2	1	1	2	3	-	+	1 hr 18 min
99	PANNER SELVAM	35	15634	LHT IH	LHT HERNIOPLASTY	4	5	5	4	4	3	2	2	5	8	+	-	1 hr 30 min
100	THOMBAYAN	67	15346	B/L INGUINAL HERNIA	B/L HERNIOPLATY	4	4	4	4	3	2	1	1	2	3	-	+	2 hr 10 min
101	SARALA	44/F	16543	LHT IH	LHT HERNIOPLASTY	4	5	5	4	3	2	1	3	5	9	+	-	1 hr 18 min